THE

physical therapy

REVIEW

Volume 34 - Number 3 March 1954

Center of Gravity Line in Relation to Ankle Joint in Erect Standing – BRUNNSTROM

Rehabilitation of Hands Injured in Industrial Accidents – CLAS

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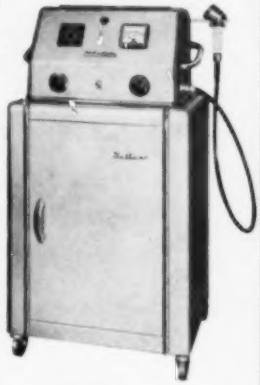

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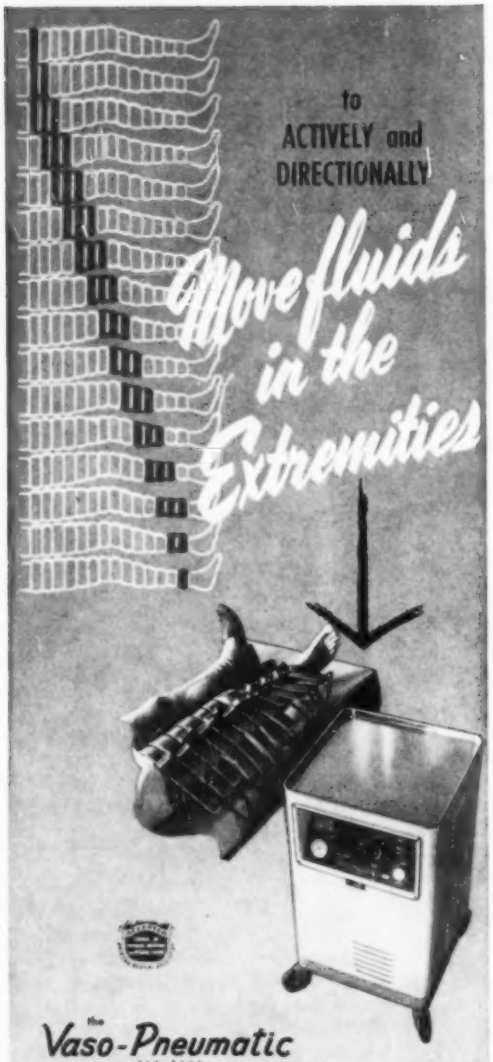

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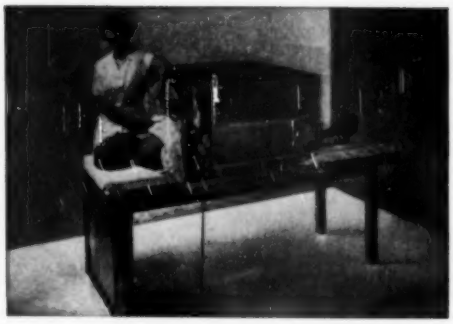

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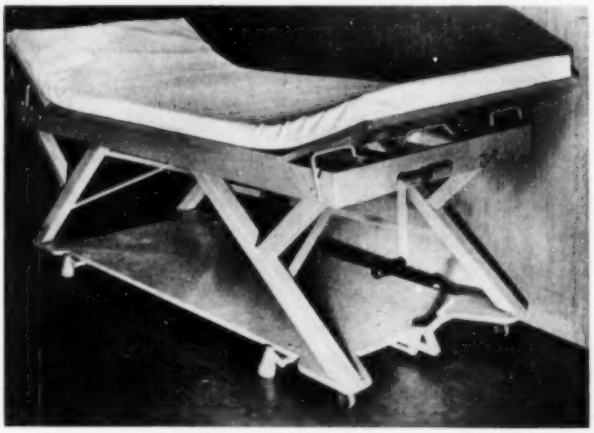

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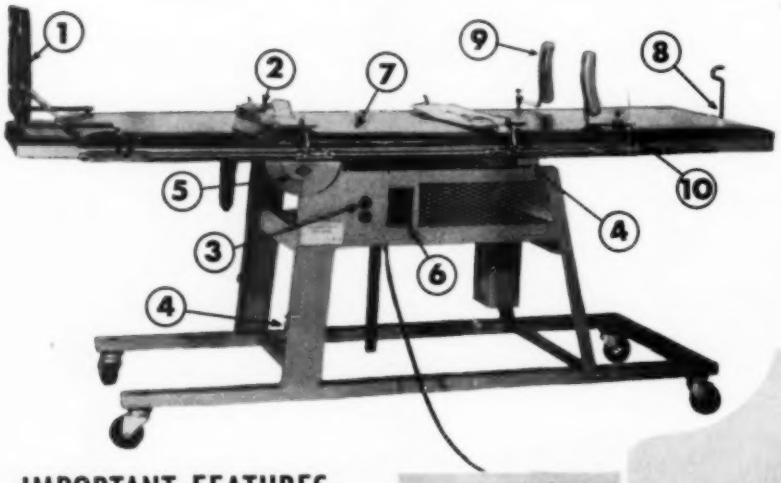

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Center of Gravity Line in Relation to Ankle Joint in Erect Standing

Application to Posture Training and to Artificial Legs

Signe Brunnstrom

It has often been stated that in good standing posture, if the subject is viewed from the side, the tip of the ear, the acromion process, hip, knee, and ankle joints are in vertical alignment, and that the center of weight of the body, likewise, is located on this line. Numerous publications also, in recent years, contain illustrations of lateral views of erect standing, with a plumbline passing through all the above points.*

This posture standard — although without scientific basis — has been widely accepted and taught to students of physical education and physical therapy, few of whom ever discovered that such perpendicular posture is against the laws of nature and is never assumed by a person who stands in a natural manner.

One can only speculate on how this faulty assumption originated. All scientific investigations show that in ordinary standing, the vertical projection of the center of gravity falls anteriorly to the axis of the ankle joint. Possibly, it was arrived at on a purely theoretical basis, the argument, perhaps, running something like this: "If all the weight bearing joints are in alignment and the body masses above these joints are balanced vertically above them, a minimum amount of muscle action is needed to maintain the erect standing position. This must be considered the best posture." Possibly, it was derived from a misinterpretation of studies carried out in Germany in the 1880's. This article has been written for the purpose of showing how such misunderstanding may have arisen, and to review, briefly, the opinions of early writers and the findings of more recent investigators.

Winslow, professor of Anatomy, University of Paris, in 1732 published "An Anatomical Exposition of the Structure of the Human Body," in which he classified muscles as "principal movers," "moderators or antagonists," and "directors or collateral movers." His discussion of muscle action in erect standing is of interest, since it indicates that there must have been no doubt in his mind where the center of gravity line falls in relation to the ankle joint: "When we stand in the most common and natural Way, the Soles of the Feet are placed horizontally, as the common Basis of the whole Body. To support the Legs like immovable Pillars upon this Basis, the Muscles which either cover or are fixed in them must cooperate. The Principal Movers are the Gastrocnemii and Soleus; the Moderators are Tibialis Anticus, and Peroneus Medius, and Minimus; and the Directors are the Tibialis Posticus, and Peroneus Maximus." In stating that in

* References 6, 9, 10.

Consultant, Kessler Institute of Rehabilitation, West Orange, New Jersey; Consultant, Veterans' Administration.

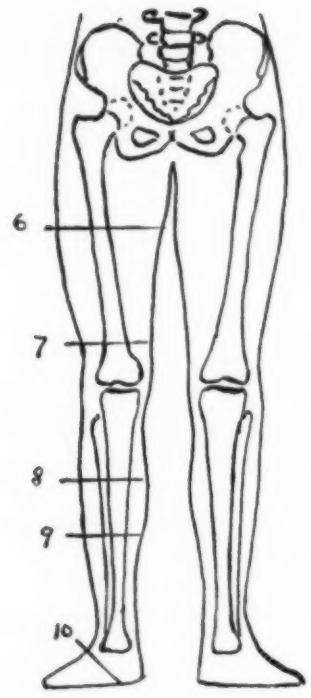

Figure 1. Levels of centers of gravity (Redrawn from Braune and Fischer)

6. Of thigh alone
7. Of the entire lower extremity
8. Of the leg alone
9. Of the leg and the foot
10. Of the foot alone

erect posture the calf muscles are the "Principal Movers" Winslow assumed that the center of gravity line falls in front of the ankle joints.

In 1889, Braune and Fischer published a study "Concerning the Center of Gravity of the Human Body, with special Reference to the Equipment of the German Infantryman." These scientists who long had been students of biomechanics, were faced with the problem of determining, in practical terms, how the pack of the infantryman should be carried for best efficiency.

The basic studies by Braune and Fischer on the location of the center of gravity of the body as a whole, and of its individual parts, were undertaken on frozen cadavers. In freezing a cadaver the body was placed in the backlying position on a board, head straight, the extremities symmetrically placed, legs extended, arms slightly bent at elbows, and the forearms half way between pronation and supination.

To determine the center of gravity of the entire body, the cadaver thus frozen was suspended by means of a steel rod; this rod or pin was sharp and thin so that it penetrated all body tissue, including bone, with comparative ease. The body was allowed to swing back and forth around this axis of suspension until it came to rest. In this position, the plumbline through the suspension axis was marked on the surface of the body. Two additional axes of suspension were chosen in such a manner that the planes through these axes were at right angles to the first plane and to each other, and the body surface was again marked to indicate these planes. The cadaver was then divided along the determined planes, and the center of gravity found at the intersection of the three planes. In the first cadaver investigated, that of a male 18 years of age, it was located at the height of the inferior edge of S2, near the plane of the pelvic inlet; it was located .5 cm. to the right of the midsagittal plane, and 4.5 cm. below the promontory. There was but little variation in the four cadavers investigated.

In order that the weights of separate body parts and the location of their centers of weight be determined, a standard technic for disarticula-

TABLE I. *Weight of individual body parts, 4th cadaver (Braune and Fischer)*

			Approximate percentage
Weight of entire body		55700 gr.	
Head and neck		3930	7
Trunk without extremities		23780	43
	Right	*Left*	
Entire upper extremity	3520	3710	13 (2 x 6.5)
Upper arm	1730	2020	
Forearm without hand	1300	1240	
Hand	490	450	
Entire lower extremity	10110	10650	37 (2 x 18.5)
Thigh	6150	6750	
Leg without foot	2970	2900	
Foot	990	1000	

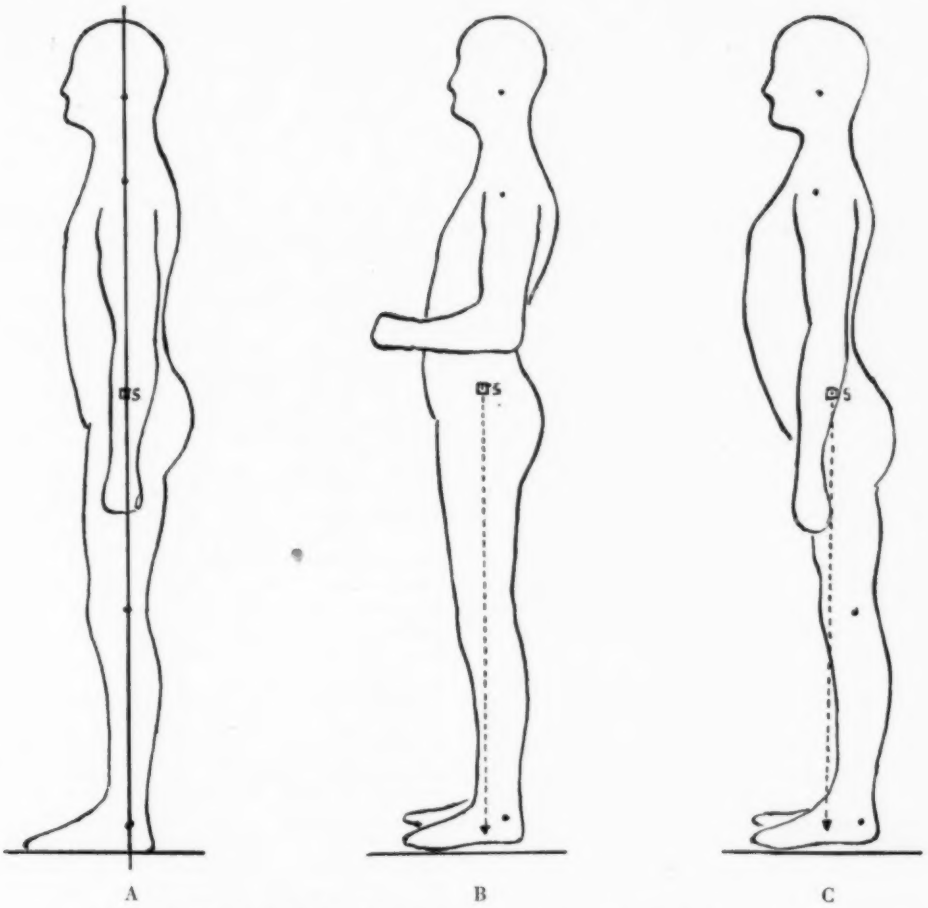

Figure 2. Three standing positions (Redrawn from Braune and Fischer)

A. Perpendicular standing, constructed from investigations on frozen cadavers. For the convenience of computations it was adopted as a basic position and was (misleadingly) called *Normalstellung.*
B. Comfortable Posture (*Bequeme Haltung*)
C. Military position (*Militärische Stellung*)

• Projection of centers of joints
• S Projection of center of gravity of body as a whole

tion at the various joints was worked out. The extremities were separated from the trunk at hip and shoulder joints and, for the determination of the smaller segments, at knee, ankle, elbow and wrist. Table I gives the findings for the weights of individual parts in the 4th cadaver.

The rod method of suspension in three planes was applied to determine the location of the center of weight of each part. Figure 1, redrawn from Braune and Fischer, shows the height of the center of weight of the entire lower extremity (level 7) and of individual segments and combinations of segments (levels 6, 8, 9 and 10).

With the weight of each body part and the location of its center of gravity known, the next step was to determine mathematically, and through geometric constructions, the location of the centers of gravity of several body parts combined. The center of gravity of the entire body was also determined in this manner. It

was found that in a cadaver frozen in the backlying position the main joints of the body as well as the centers of weight of the various body parts (except those of the feet) were located in the same frontal plane. This position, that of a frozen cadaver placed upright (Figure 2A), for reasons of convenience, was utilized by Braune and Fischer (and later by Fick, Strasser and others) as the basic position. Frontal, sagittal, and transverse orientation planes were laid through the center of gravity of the body, and the coordinates of various body parts determined. In this basic position, then, atlantooccipital, shoulder, hip, knee, and ankle joints were all located in the frontal orientation plane. Unfortunately, the investigators chose to call this position *Normalstellung*. A living subject was made to stand in this manner, and it was found that such position could be assumed or approximated in the living. At no time, however, do the authors claim that this is comfortable posture. In the authors' own words: "For the time being it will have to be left open if this position is a comfortable one. . . . We had only one purpose in mind, namely, to standardize a natural* position which lends itself well to measurements and computations. We wish to call this position *Normalstellung*."

Braune and Fischer then proceeded to determine the alignment of parts in living subjects standing erect. Three standing positions were investigated; namely, *Normalstellung* (described above), *Bequeme Haltung* (comfortable posture), and *Militärische Stellung* (military position). In addition, investigations were carried out on a soldier carrying full pack, and on a soldier holding the rifle in various positions.

The use of the two words *Stellung* (position) and *Haltung* (posture) should be noted. Braune and Fischer's *Bequeme Haltung* is the position which a subject assumes when standing comfortably, without paying any attention to how he stands, and therefore is his normal posture (Figure 2B). *Normalstellung* (Figure 2A) is an artificially assumed posture, and would better be called "perpendicular posture" as suggested by Amar. Military posture (Figure 2C) is another forced position, in accordance with the military regulations of that era.

An abstract in the English language of Braune and Fischer's studies was prepared by Hirt et al. (1944). These authors write: "Nothing in their writings (i.e., of Braune and Fischer) indicates a belief that the limb systems would spontaneously aline themselves in a common frontal orientation plane. Indeed, they themselves reiterated again and again that the multijointed human body is so constructed that it automatically assumes a position which will bring the weight line as nearly as possible to the middle of the supporting base. To achieve this, which is the single most important tenet of physiologically normal standing, one arrives at an alinement wholly incompatible with the distribution of the parts in *Normalstellung*. Care should therefore be taken not to imply that *Normalstellung* is the ideal posture of man, for this concept does violence to the purely experimental purposes for which it was originally conceived."

Subsequent publications in the German language again used the term *Normalstellung* in the above sense, and illustrations appear showing the weight line passing through the main weight-bearing joints. Since the authors of these publications (R. Fick, H. Strasser and others) also show illustrations of "relaxed posture," with the center of gravity line falling anteriorly to the ankle joint, it is evident that they recognized that when a person stands "relaxed" the weight line moves forward as compared to its location in *Normalstellung*. Fick also states that for optimum stability the vertical projection of the center of gravity should fall 7 to 8 cm. anteriorly to the ankle joint. It is hard to understand why the term *Normalstellung* was retained to indicate perpendicular posture.

Hesser made extensive studies on the location of the center of gravity line in relation to the base of support in erect standing. He found that in all subjects there was a considerable swaying motion forward and backward, and that this sway varied not only in different persons, but also in different tests of the same person. In 31 determinations on 7 subjects the minimum sway in anteroposterior direction was 9 mm. and the maximum 27 mm. The center of gravity line always fell anteriorly to the axis of the ankle joint, the minimum distance being 10 mm. and the maximum 48 mm. (It must be noted that this investigator found the lateral projection of the "midpoint" of the axis of the talocrural joint to lie 10 mm. anteriorly to the tip of the lateral malleolus. This must be taken into consideration if his results are compared with those of other investigators, some of whom used the lateral malleolus to represent the lateral projection of the axis of the ankle joint).

Steindler in analyzing stresses and counterstresses of the foot states: "Under normal conditions, the line of gravity falls about 4 cm. in front of the ankle joint. The ratio between anterior support and the intersection point, to

* "Natural," i.e., position which can be assumed by a living subject. S. B.

that of the posterior support is approximately 5:3, and the distribution of weight between ball and heel, accordingly, as 3:5." (This would seem to indicate that Steindler is analyzing a posture in which the center of gravity falls posteriorly to the geometric center of the base of support).

Morton writes: "In normal stance, a perpendicular dropped from the body's weight center, falls half way between these two margins (heel line and front margin of structural support), passing between the navicular bone of each foot. Thus, the body's center of weight, being located above the central point of the contact area, receives a relatively equal margin of stabilizing support in every direction."

Adolf Basler in investigating the posture of subjects standing at ease found that the weight line always fell anteriorly to the axis of the ankle joint. The exact location of the axis of the ankle joint was determined by X ray, and the vertical projection of the center of gravity by means of a "center of gravity scale," invented by him (1931). In persons whose foot length varied from 24 to 26.5 cm., this projection was found to lie 3.6 to 6.7 cm. anteriorly to the axis of the ankle joint (1942-43). Tension in the calf muscles, needed to equilibrate gravitational forces at the ankle joint, was also determined. In one subject weighing 60 kg. and standing on both feet, it amounted to 75.4 kg. In none of the subjects investigated did the tension surpass one-seventh of the "absolute strength" of the calf muscles (greatest possible tension which the muscles could produce by active contraction). When the subject carried a load on the back, the tension often rose to more than one-fifth of the "absolute strength," but there was no tendency to shorten the anterior lever arm by transferring the body weight toward the back (1942-43). These findings would indicate that the body automatically tends to maintain a position of optimum stability, since the center of gravity line never moves very far away from the geometric center of the base of support, even under conditions requiring considerable expenditure of muscular energy.

Hellebrandt (1938) substantiated the findings of Hesser (1918), Basler (1929) and others that in erect standing the body sways continuously and suggests that erect standing, in reality, is "movement upon a stationary base." In investigating stance in college women, Hellebrandt et al. (1939) found that in practically all subjects the anteroposterior oscillations were of larger amplitude than the lateral ones, and that each individual displayed a very definite and constant pattern of sway.

In another study Hellebrandt et al. (1939) determined the mean value of the vertical projection of the center of gravity in 109 subjects (43 males and 66 females) who stood erect for 3 minutes, determinations being made at intervals of 5 seconds. In 85 per cent of the subjects the mean projection fell slightly in front of the geometric center of the base of support, toes disregarded; in 15 per cent slightly behind it; but always in front of the axis of the ankle joint. The finding indicates "that the perpendicular dropped from the average center of weight falls remarkably close to the geometric center of the base. This is in keeping with the dictates of stable construction and is apparently a fundamental relation, not easily altered. We have demonstrated that it remains undisturbed by the heel height of the shoes worn by women, unless their pitch is extreme. Compensation is automatically achieved by knee flexion and lordosis."

In investigating the influence of the Army pack on postural stability and stance mechanics, Hellebrandt et al. (1944) found that "The compensatory adjustments to a load carried on the back are sufficiently good to enable the vertical projection of the center of gravity of the body as a whole to remain within 7 per cent of the geometric center of the base irrespective of how the regulation Army pack is carried."

The influence of pregnancy on postural stability and body alignment was investigated by Fries et al. (1943). In pregnancy, the load is carried anteriorly, and this is unfavorable as compared to a load carried on the back, since it augments the normal forwardly unbalancing effect of gravity. It was found that pregnancy causes "a temporary overcompensation which displaces, backward, the average location of the vertical projection of the center of gravity as a whole." By this backward displacement, the margin of safety is widened anteriorly and "thus protects against an acute unbalancing force which might lead to a forward fall, endangering the fetus."

In a study on stance mechanism of amputees, Hellebrandt et al. (1950) found that "the majority of the amputees maintain the vertical projection of the center of gravity within the middle fifth of the transverse diameter of support and remarkably close to the geometric center of the base."

In Table II the findings of the various authorities in regard to the relation of the center of gravity line to the axis of the ankle joint have been compiled. The methods utilized in determin-

TABLE II. *Center of gravity line in relation to the ankle joint, expressed in cm. anteriorly to the axis of the joint*

	cm.
Braune and Fischer	
"Normalstellung"	0
"Bequeme Haltung" (comfortable posture)	4
Military posture	7
Hermann von Meyer	3
Hesser (compare text)	1.0 to 4.8
Basler (compare text)	3.6 to 6.7
Hellebrandt et al.	
Mean of one group	4.92
Mean of another group	5.65

ing the vertical projection of the center of gravity differed with the various investigators. In most of the studies only one determination was made for each subject, postural sway being disregarded. The findings of Hellerbrandt et al. must be considered the most significant, since records were made of the oscillations of the vertical projection of the center of gravity while the subjects stood erect for three minutes, and its mean location was obtained from readings taken every 5 seconds. The size of the base of support, as pointed out by Basler (1942-43) and by Hellebrandt (1939) must also be taken into consideration, or the findings may be somewhat misleading. The figures, although they are not absolutely comparable, are of considerable interest, since all investigators found that the perpendicular through the center of gravity fell anteriorly to the axis of the ankle joint.

Above findings seem to indicate that there is an automatic neuromuscular mechanism which tends to equilibrate the body in such a manner that maximum stability is maintained, i.e., the center of gravity line tends to fall near the center of the base of support. This fundamental rule was found to apply to varying conditions, such as increased height of heels, the carrying of a load (which necessitates more muscular tension in the calf muscles), and in amputees wearing artificial legs. For the evaluation of posture this should be kept in mind, so that when standards for posture are established, they conform to this automatic regulating mechanism. Posture training should be given within the frame of this mechanism and the "perpendicular posture" should not be advocated.

The posture of an amputee wearing an artificial leg (or two artificial legs) is, in part, determined by the alignment of shin to foot. In standing, stability between shin and foot of the artificial leg is possible only when the instep rubber is fully compressed by the body weight; foot stability, in turn, is needed to attain knee stability in the above knee prosthesis. The careful regulation of the height of the instep rubber, therefore, is of primary importance in aiding the amputee to assume a normal erect standing posture. It must be remembered that in erect standing of non-amputees, the calf muscles are able to stabilize the foot against gravitational forces at any desired angle, but that the artificial foot has only one point of stability, and that this point must be sought by the amputee. If the height of the instep rubber is improper, to attain stability, the amputee is forced to make undesirable postural compensations of the upper body. These often become marked in the bilateral above knee amputee, who has to rely on bilateral artificial ankle stability. In stressing the proper adjustment of the height of the instep rubber, it must simultaneously be pointed out that this factor by no means is the only one affecting the posture of the amputee — the discussion of other factors, however, lies outside the scope of this paper.

SUMMARY

1. The assumption that in ordinary erect standing, when the subject is viewed from the side, a plumbline through the center of gravity of the body falls through the tip of the ear (atlanto-occipital joint), the acromion process (shoulder joint), the tip of the greater trochanter (hip joint), and through knee and ankle joints, is a faulty one.
2. Investigations indicate that in natural standing the vertical projection of the center of gravity falls anteriorly to the ankle joint.
3. The "perpendicular" posture standard may have arisen from a misinterpretation of the work of Braune and Fischer, who described the alignment of a frozen cadaver placed in an erect position, and who, unfortunately, chose to call this posture *Normalstellung*.
4. There seems to be an automatic neuromuscular mechanism which regulates stance for optimum stability, so that a perpendicular through the center of gravity tends to fall near the center of the base of support. In training for good posture, the body should

not be forced into a perpendicular posture which violates the automatic stance pattern.

5. In the construction of artificial legs, to obtain natural erect standing posture of the amputee, the joints must be placed in an alignment which facilitates the maintenance of the center of gravity line near the center of the base of support, or undesirable postural compensations result.

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*Rehabilitation of Hands Injured in Industrial Accidents**

Blanca Clas, B.S.

INTRODUCTION

Hand injuries are responsible for a large amount of compensation expense to the State Insurance Fund of Puerto Rico. In the Annual Report of the Santurce Clinic of the State Insurance Fund in 1952 it was reported that of an average of 247 patients treated daily, 29 per cent had tendon injuries of the hand. Of these, 20 per cent were left hand cases (See figure 1) and the tendons of the thumb and radial side were most severely injured (see figure 2). This can be explained by the fact that sugar cane farming is the main industry in the island and the sugar cane cutter grasps the cane with the left hand while cutting it with a "machete" held in the right, thus making the left hand vulnerable to injury. The number of patients increases during the cutting season, which lasts from January to June with the peak during the month of March (See figure 3).

The most usual tendon injury is to the extensors and the usual treatment procedure is as follows. Surgical repair takes place as soon as possible since it is felt that tendons should be sutured within 6 hours and not later than 24 hours after injury. At this clinic the technic of Dr. Bunnell is followed, i.e., the end to end suture of the tendons with pull-out wire or suture located at a distance from the injury. Suturing is accomplished with surgalloy No. 3. The wound is covered with merthiolate dressing and sterile sheet wadding and a plaster of paris bandage is applied for immobilization of the affected fingers in a neutral position. Immobilization is maintained for three weeks. To prevent postoperative

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* Read by Illeana Vazquez-Santana at the Annual Conference of the American Physical Therapy Association, June 1953, at Dallas, Texas.

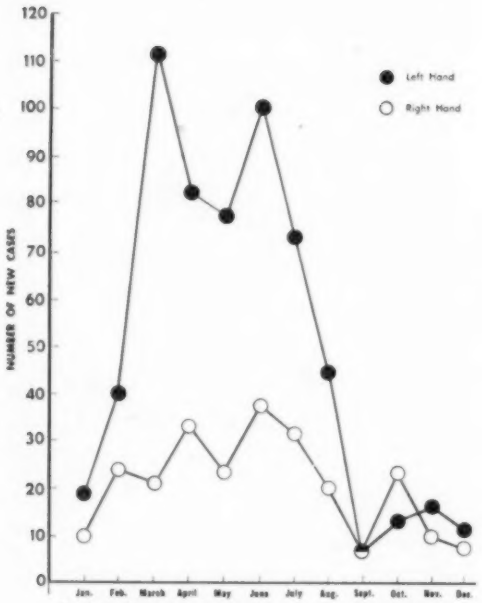


Fig. No. 1—Number of Hand Injuries referred to the Physical Therapy Department (1952) Physical Medicine & Rehabilitation Center of the State Insurance Fund, Santurce, P.R.

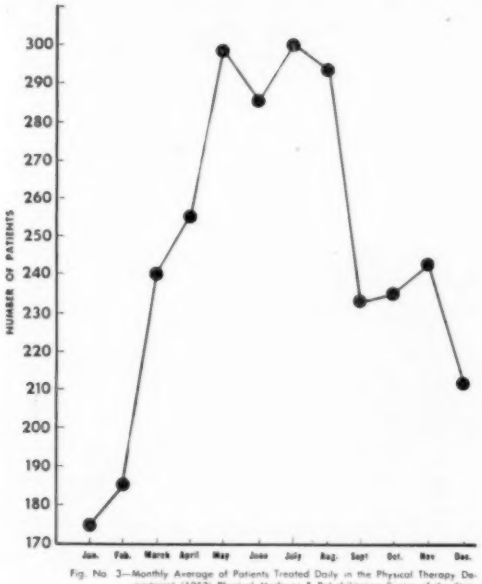


Fig. No. 3—Monthly Average of Patients Treated Daily in the Physical Therapy Department (1952) Physical Medicine & Rehabilitation Center of the State Insurance Fund, Santurce, P.R.

edema, the involved arm is kept in an elevated position by tying it to the sideboard of the bed for 48 to 72 hours. Patients are then allowed early physical therapy consisting of general bed exercises and active movements to the unaffected fingers, elbow, and shoulder. Passive movements for the affected hand are not given until at least 21 days after surgery. At this time, the cast and sutures are removed and the patient is sent to the Department of Physical Medicine for his complete rehabilitation. Here the patient follows a full-day program of active, passive and progressive-resistance exercises along with heat and massage to loosen any contracted scar tissue.

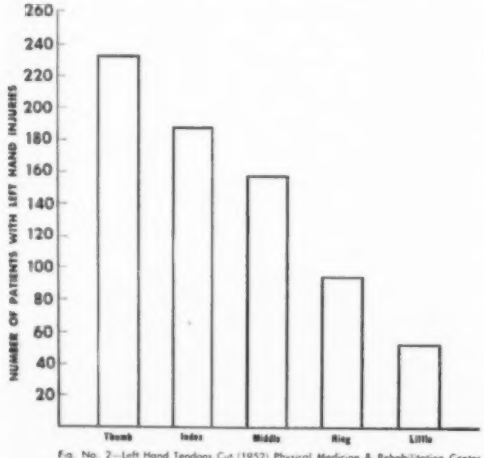


Fig. No. 2—Left Hand Tendons Cut (1952) Physical Medicine & Rehabilitation Center of the State Insurance Fund, Santurce, P.R.

TREATMENT PROCEDURE

On the first day the patient reports to the Department an electrical test is done to determine qualitative and quantitative reactions and the test is repeated after 15 days in order to record progress. On the basis of the findings from this test, Faradic current is prescribed for reeducation of the affected muscles. As the current is applied, the patient is asked to help by trying to contract the muscle actively. The intensity of the current must be high enough to produce the maximum contraction within the patient's tolerance. It has been found that this procedure provides maximum contraction with the least pain.

Various forms of heat are used to increase the circulation and so improve the tone of the muscles affected. In this clinic, infra-red and whirlpool are most commonly prescribed. Massage is added to aid the circulation, to reduce edema, and to help loosen the scar tissue.

Although the repair at the time of operation

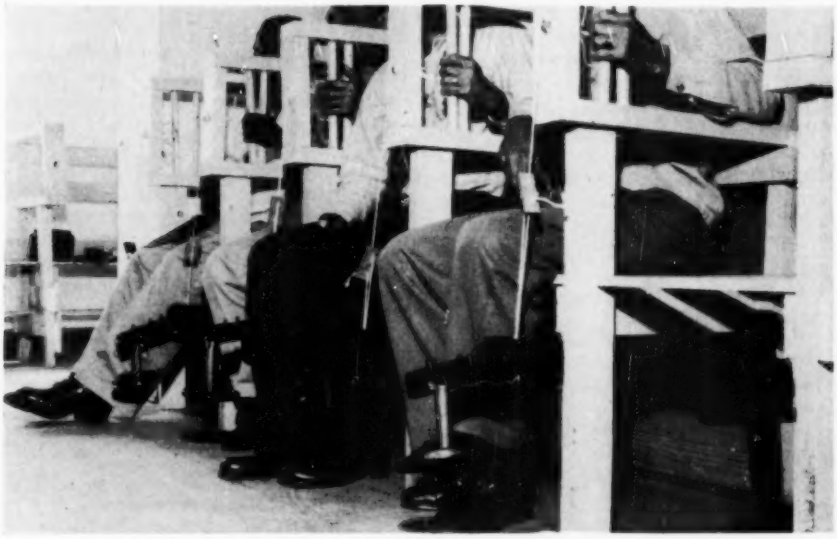


Figure 4. Patients working at the "gripper" apparatus devised by Harold D. Storms, Director of Physical Medicine and Rehabilitation Center of the State Insurance Fund in Puerto Rico.

is essential for the satisfactory rehabilitation of this type of injury, correctly graded active and passive movements also are very important for full functional recovery. Three to three and a half weeks following surgery, gentle passive movements which increase in intensity are started so that any adhesions between the suture line and surrounding tissues may be stretched and eventually loosened. Great care must be taken at the beginning of this passive movement in order to prevent separation of the sutured tendon. The routine followed is from active and careful passive movements in the direction of the pull to active and more intense passive movements in the direction against the pull.

When active exercises are begun, patients are enrolled in groups with others having similar disabilities. These groups, seated comfortably on benches, gather around the physical therapist as he explains and demonstrates the exercise to be performed. The patients then attempt to do the prescribed movements with both hands while the physical therapist observes the progress and helps individually as needed. The exercises and activities usually included for patients with hand injuries are as follows:

A. Exercises
   1. Make a fist and then open the hand wide
   2. Flex the tips of the fingers
   3. Flex fingers in middle joint and straighten
   4. Flex metacarpophalangeal joint, keeping fingers straight
   5. Adduct and abduct fingers
   6. Palms down, extend fingers
   7. Touch thumb to tips of all fingers
   8. Flex, extend, abduct and adduct wrist
   9. Make circle with wrist
   10. Make circle with thumb.

B. Activities
   1. Volleyball
   2. Basketball
   3. Ping-pong

RESISTANCE EXERCISE PROCEDURE

Active movements will increase muscle strength to a certain point, but to get the maximum strength and endurance, exercises against resistance are essential. Because strength of grip is increased only by gripping, a special apparatus based on the Oxford technic of progressive-resistance exercise has been devised by Dr. Harold D. Storms and has proved very effective (See figure 4). This device consists of a lever system which requires only one weight to be used over a range of either 5 to 25 pounds or 10 to 40 pounds depending on the basic weight selected. By placing this weight at different locations on the lever arm it is possible to obtain increased or

decreased amounts of resistance. Finer distinctions of amount of resistance can also be obtained by adjusting the rope which controls the weight thus altering the leverage of the apparatus. The use of one weight to obtain many degrees of resistance reduces materially the equipment which has to be handled by the physical therapist.

Starting with the highest resistance which the patient can tolerate, ten grips are made at a constantly decreasing level of weight load until the minimum is reached. At each session, which should not be less than once a day, the patient performs ten grips to each individual amount of resistance and continues this regime for one week. At the first session the following week a new maximum is selected and the routine repeated. Soon the patient is making one hundred or more strong grips each day with a resultant rapid increase in his ability to perform more work.

As can be seen from figure 4, the apparatus does not take up much floor space (an important fact where space is limited) and can be built as a single unit or in multiple.

In estimating ability to return to work, the maximum load-tolerance of the unaffected hand is used as a criterion and the ratio of this to the injured hand is an indication of ability.

WORK TEST

When the patient is able to lift his maximum weight he is referred to Work Therapy. Here he is submitted to a test of full-day functional activities very similar to those of his previous job or the job he plans to do if he is unable to return to his old one. For the patient who formerly cut sugar cane there is a 2-inch rope suspended in a large frame and a wooden "machete" which simulates the activity he will be required to do. To evaluate his ability, the patient attempts to execute the following:

1. Cutting with the right hand while holding the rope with his left.
2. Cutting with the left hand to test the effectiveness of the grip.
3. Performing a shovelling motion with the "machete" to test strength and grasp.
4. Piling sacks weighing 30 to 40 pounds to simulate loading activities.
5. Carrying 100-pound loads on a wheelbarrow to test general strength and endurance.
6. Lifting weights with a block and tackle to test general strength and lifting power.

Successful completion of this series of activities with good strength and mobility of the hand is a valid indication of the patient's rehabilitation and his readiness to return to work.

Meet Our New Contributors

Blanca Elisa Clas, Physical Therapist, State Insurance Fund, Santurce, Puerto Rico, began her college studies at the University of Puerto Rico, and completed requirements for a B.S. degree at Arkansas Agricultural and Mechanical College in Monticello, Arkansas. Miss Clas received her physical therapy preparation at Northwestern University where she was awarded a Certificate in 1951. She is a member of the American Physical Therapy Association.

Ethel M. Willmer, Physical Therapist, McGregor Center, Detroit, was graduated from Chelsea College of Physical Education, London, England, and holds a Distinction Diploma from that school.

Miss Willmer has taught physical education in schools and colleges in England, and was Assistant Organizer of Physical Education for the city of Sheffield. She also has held the post of Lecturer of Kinesiology at Chelsea College of Physical Education.

Prior to her present assignment, Miss Willmer was employed in the physical therapy departments of the Hospital for Special Surgery, New York City, and at Sigma Gamma Hospital School, Mt. Clemens, Michigan.

Miss Willmer is a member of the American Physical Therapy Association and the Chartered Society of Physiotherapy (England).

Suggestions from the Field

A Dynamometer for Measuring Quadriceps Femoris Strength

Maria M. Kennedy

As the result of attempts to find an accurate and simple mechanical method of evaluating strength of the quadriceps femoris muscle for a study being made following a series of patellectomies, the apparatus herewith described and illustrated was designed in our physical therapy department.

Effort was directed toward devising equipment which would enable us to test the quadriceps femoris muscle with the knee held at both 180 degrees and at 90 degrees, with the force of gravity eliminated and with the forces obtaining directed at a right angle. The testing apparatus consists of a supplementary table top which fits over a regular treatment table; the patient lies upon this on his side—opposite to the one being tested. A frame attached to the table top supports, in a horizontal position, the thigh of the leg being tested, thus allowing the knee to move freely.

Chief Physical Therapist, Miller Orthopaedic Clinic, Charlotte, North Carolina.

The supporting platform is constructed of ½ inch plywood measuring 36 inches by 36 inches with the stabilizing frame for thigh support built on one end. This frame is 14 inches in over-all height. The platform supporting the thigh is 7 inches above the table, which leaves the upper half to form a trough 7 inches high, 7 inches wide, and 8 inches in length. The trough is lined with felt and padded as needed for adjustment to size of the extremity being tested. A wooden lip is fixed to the under surface of the over hanging side margins to prevent the equipment from slipping during tests. (See figure 1.)

The dynamometer used in the tests is comprised of a set of two double pulleys, a length of rope, and spring scales with capacity of 100 pounds. One end of this equipment is fastened to a wide canvas cuff circling the patient's ankle. The other end is secured to an adjustable pipe frame fastened to the head of the table in the 90 degree test and to a fixture in the side wall in the 180 degree test. The pipe frame is utilized also as a fixed point against which the patient stabilizes himself during the 90 degree test. When force was exerted it was found that support was necessary to prevent twisting of the dynamometer. This support may be supplied by a box of proper height placed on the testing table in the 90 degree test, and on a small supplementary table in the 180 degree test (See figure 2).

Scales with capacity of over 100 pounds are desirable since we found in three patients tested

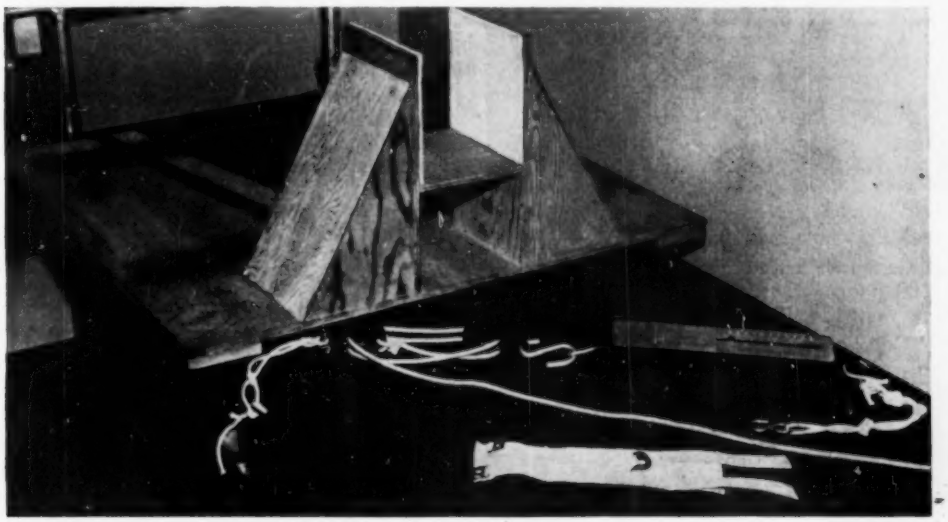


Figure 1.

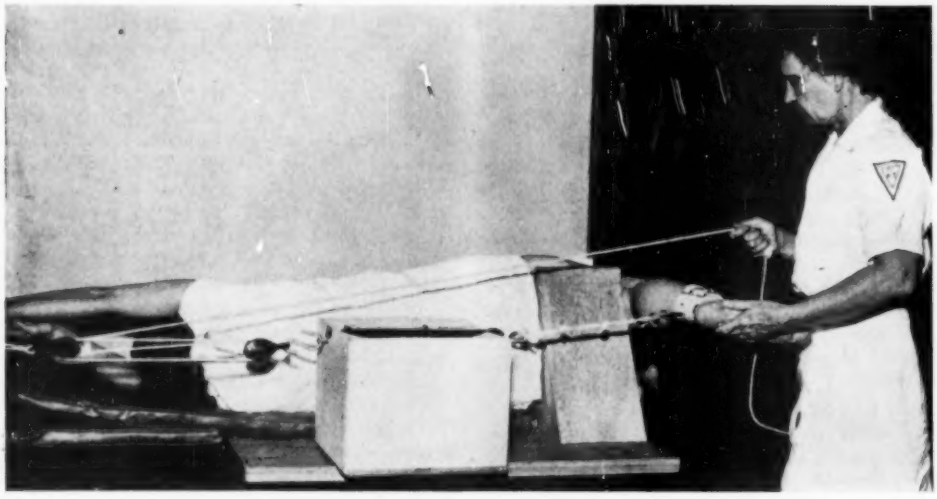


Figure 2. Testing at 90°

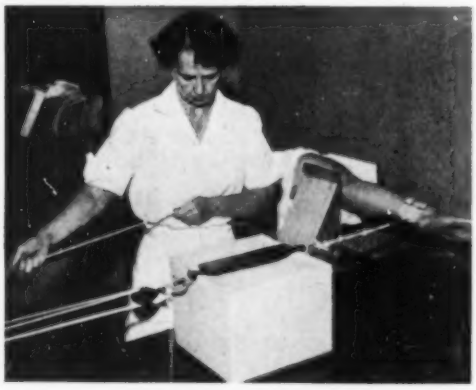


Figure 3. Testing at 180°

that the muscle had not reached its capacity load at 100 pounds to which measurements in this study were limited. Testing by this means requires two operators. One observes the knee undergoing the test and "alerts" the second operator at the point at which the muscle begins to weaken. The second operator controls the power and records the highest reading reached on the scales during the resistance test. The first reading is accepted, thus eliminating the fatigue factor.

In a study of 23 patients, the normal knee as well as the patellectomized one was tested. The results show that: (1) in the uninvolved knee, extensor power is greater in the fully extended position than at 90 degrees; (2) in the patellectomized knee, this is correspondingly true but generally is not equal to that of the normal knee.

Detailed results of the test are incorporated in a paper entitled "The Use of Patellectomy" by Dr. Ira H. Rapp, The Miller Orthopaedic Clinic, Charlotte, North Carolina. This paper was read before the Orthopaedic Section, Southern Medical Association, Atlanta, October 28, 1953, and will be published in the *Southern Medical Journal.*

Maria M. Kennedy attended Boston University and Boston School of Physical Education where she received her certificate in physical therapy. Upon graduation she was affiliated with the Physical Therapy Department of the Boston City Hospital, and was Physical Therapist in Corrective Gymnastic Program for the Detroit Public School System. Miss Kennedy has held her present position as Chief Physical Therapist of the Miller Orthopaedic Clinic for over twenty years.

She is a member of the American Physical Therapy Association, is Secretary of the North Carolina State Examining Committee of Physical Therapists, and is active in the North Carolina Physical Therapy Association.

Suggestions from the Field

A Device to Facilitate the Locking and Unlocking of the Brace Knee Joint

Ethel M. Willmer

Many patients including those handicapped by polio, cerebral palsy and paraplegia, find it impossible to lock their own braces. A device to enable the patient to do this himself has been found to be very effective.

It consists of an aluminum rod 20 inches long and with the width and thickness of the upright of an average brace. A twist 5 inches from one end brings the plane of that part at right angles to the plane of the longer part thus forming a handle. At the lower end is a cross piece moulded in the same plane and having similar width and thickness. The cross piece is 4¾ inches long and its center joins the main rod at an angle of 35 degrees. Hooked metal pieces extending inward ¾ inch from each end are moulded to the opposite edges of the cross bar which bisects them and thus affords four hooks just wide enough to surround the upright of a brace; the two at each end open toward the opposite direction from those at the other. This arrangement of the hooks makes it possible to use the device on either the inside or the outside upright of the brace, left and right.

In use the hooks are placed over the upright below the knee joint so that the lower hook pulls up and the upper hook pushes down on this part of the upright. Pressure applied at the handle by one hand of the patient enables the leg to be lifted into line with the thigh while the other hand slips the lock into place.

This device was designed by Dr. William H. Blodgett of Detroit, Michigan.

Physical Therapist, McGregor Center, Detroit, Michigan.

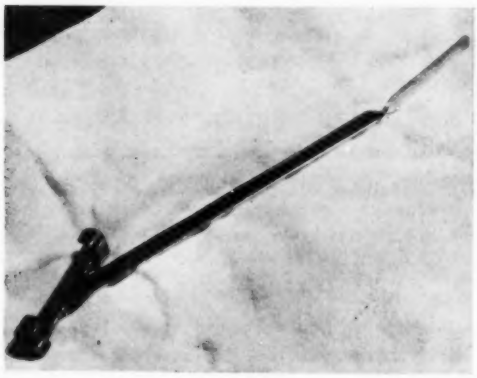


Figure 1.

Figure 2.

Figure 3.

Conference News Note

There will be no workshops during the Conference period this year. Special and graduate courses are being offered in the evening prior to and possibly following the Conference and will be listed in the Physical Therapy Review.

Editorials

If one compares the list of existing State Registration laws which appeared in the February Review with the similar list of a year ago the development is pleasingly obvious. This rapid and important development of legal control and accredation is even more gratifying when one compares it with the situation of even ten years ago when registration and licensing regulations by states were noticeably absent. There is little doubt that several factors have been responsible for this and that a major one has been the development of both the importance and recognition of the field of Physical Therapy.

Certainly a large portion of the credit for this development must go also to the many persons who, as members of various committees of the American Physical Therapy Association, have worked long and diligently to promote both interest in and the accomplishment of the existence of the present laws. Not many years ago it was all too usual to hear comments relative to the supposed impossibility of securing state regulations. That such defeatism was not accepted is directly due to the enthusiasm and farsightedness of those members concerned with varied public law groups.

Now that we have reached a favorable level of accomplishment we feel it is necessary to pause and reevaluate many facets of the whole picture. Attaining a goal is never enough unless the responsibilities and advantages of the goal are accepted and utilized for progress.

In the application of this thought to the subject of legal registration there is one outstanding point; we refer to the failure of some practicing physical therapists to take advantage of these existing laws. This situation may seem paradoxial for, having worked, argued, and fought for their existence, it makes little sense when we ignor them.

It is unfortunate but true that a number regard the process of securing necessary credentials as "just too much trouble" and consequently procrastinate overlong. Others still fail to recognize the importance both to themselves and the profession of their individual cooperation in meeting this responsibility. We do not mean to imply that any physical therapists are practicing illegally. In those particular states where licensing is mandatory any person who is so foolish as to neglect this duty is obviously courting disaster. Rather we refer to those areas where registration is optional.

Part of the difficulty may be in the fact that many of these regulations are new and little known or understood. In such cases it is obvious that the chapter has a real responsibility in disseminating information and creating in each member a complete appreciation of the advantages which state registration presents. This is true also in states where registration has existed for a long while but in these instances there is an even greater responsibility placed on each member to inform new members as to the situation.

We now have reached an admirable level of recognition of our profession by various governmental agencies but we also must meet the demands this recognition places on us. It is everyone's job not only to be familiar with his own area's regulations but to promote a full and complete adherence to them.

SEE YOU ON THE

BLUE PACIFIC SHORE IN '54

Los Angeles, California, June 27 - July 3, 1954

Hotel Statler

Business Meetings and Preliminary Program Schedule

June 25th and 26th		Executive Committee Meetings
June 27th		
10:00 a.m. to	5:00 p.m.	**School Section**
5:00 p.m. to	8:00 p.m.	Hoolaulea (Make Merry) — Southern California Chapter, Host
June 28th		
9:00 a.m. to	12:00 noon	Registration
10:00 a.m. to	12:00 noon	Group Meetings
2:00 p.m. to	5:00 p.m.	Opening Session — Speakers to be announced
7:00 p.m. to	10:00 p.m.	Scientific Movies
June 29th		
9:00 a.m. to	12:00 noon	House of Delegates
2:00 p.m. to	5:00 p.m.	**Neurophysiology of the Peripheral and Central Nervous Systems**
5:00 p.m. to	8:00 p.m.	Election of Officers
June 30th		
9:00 a.m. to	12:00 noon	**Rehabilitation of the Brain Injured**
9:00 a.m. to	12:00 noon	**Sequelae of Cord Injuries**
2:00 p.m. to	5:00 p.m.	House of Delegates
6:00 p.m. to	7:30 p.m.	Reception of National Officers
7:30 p.m.		Annual Banquet
July 1st		
9:00 a.m. to	12:00 noon	**Respiratory Problems**
9:00 a.m. to	12:00 noon	**Management of the Cerebral Palsied**
12:00 noon to	2:00 p.m.	Style Show — Luncheon
2:00 p.m. to	5:00 p.m.	**Research and Clinical Studies Reports**
7:00 p.m. to	10:00 p.m.	Scientific Movies
July 2nd		
9:00 a.m. to	10:30 a.m.	**Demonstration of a Case Conference**
11:00 a.m. to	12:00 noon	**Demonstration of Home Instruction**
2:00 p.m. to	5:00 p.m.	House of Delegates
July 3rd		
9:00 a.m. to	12:00 noon	Workshop on Chapter Organization

A recess will be scheduled each Morning and Afternoon to visit exhibits.

Facts About the Conference

Hotel

The Statler Hotel is air conditioned and is one of the newest and most modern hotels in the country.

Rates

Are from $6.50 for a room and bath for one. Double bedded rooms with bath for two start at $11.50. Living room, bedroom and bath for two start at $22.00. For each additional person in double or twin-bed room the extra charge is $2.50 per day.

Reservations

Reservation cards will be sent out with the dues notices. Those who wish to room together should send in only one reservation including names of all roommates. The number of minimum priced rooms is limited and the hotel will acknowledge reservations within a range dependent upon availability at the time of arrival. When single rooms are filled the hotel will assign roommates.

Registrations

Active and Inactive Members	$5.00
Student Members	1.00
Other Physical Therapy Students	2.00

Advance registration cards will be sent to members with the dues notices. If you do not register in advance you *must* present your membership card when you register.

Physical therapists who are graduates of approved schools but not members of the Association may attend the general sessions on introduction by a member and paying a registration fee of $15.00.

Exhibits

Technical, scientific and chapter exhibits will be a part of the Conference. Technical exhibitors should contact Gordon M. Marshall, 30 West Washington St., Chicago 2, who is Exhibit Manager.

Workshops

Pre- and postconference workshops will be offered by some of the facilities in the area and announcements of these will be found in this and forthcoming issues of the Physical Therapy Review.

Motion Pictures

Time has been set aside for showing motion pictures and slides which would be of interest to physical therapists. Any members or organizations who have movies, slides, or film strips to show at the Annual Conference may apply for inclusion in the program to the American Physical Therapy Association, 1790 Broadway, New York 19, New York. All applications must be filed by April 1, 1954.

All applications should contain the following information:

1. Title and brief description of the subject matter covered
2. Length of film and time needed to show it
3. Size of film — 8, 16, or 32 mm; silent or sound; black and white or colored
4. Number of slides and time needed to show them
5. Size of slides — 2 x 2, or 3 x 4; kodachrome or black and white
6. Name of organization and individual responsible for material

The Program Committee will select those films and slides which in their judgment will be of greatest interest to the audience and which will fit into the time allotted. Only films and slides thus selected will be shown.

Research and Clinical Studies Section

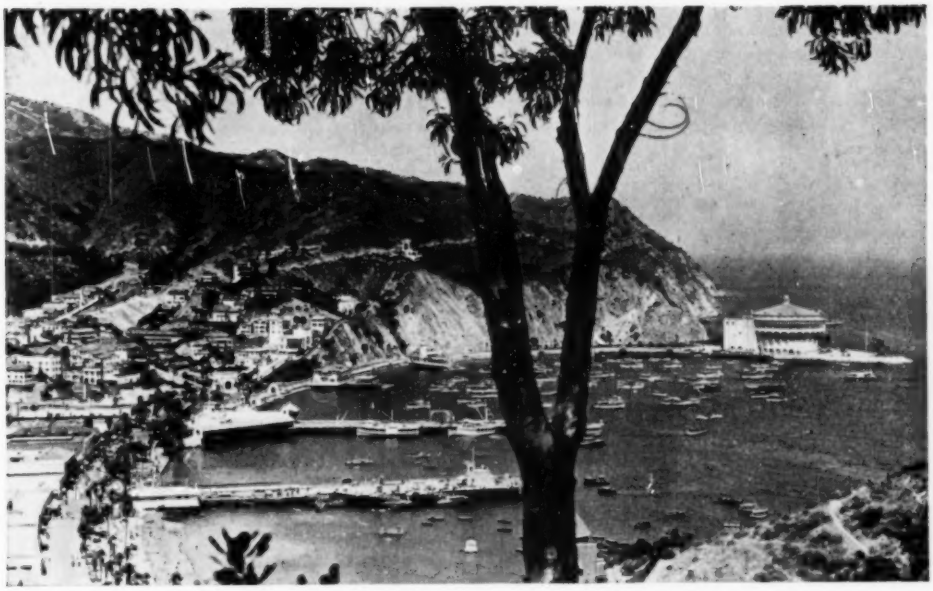
Abstracts of papers to be read at the 32nd Annual meeting of the American Physical Therapy Association which meets in Los Angeles, California, June 27 to July 2, are due in the National Office, 1790 Broadway, New York 19, on or before March 15, 1954.

Abstracts should be not more than 250 words long, or one typewritten page, double-spaced. Abstracts should be sent in triplicate to expedite review by the Research and Clinical Studies Committee.

Abstracts should have a concise but inclusive title. Other information required is the full name of the author or authors, degrees held, position and the institution where the work was done.

Titles will be selected and essayists notified by April 1st. Following the custom established in 1952, discussants will be selected from the membership of the Association.

Completed papers are due in the National Office by May 15.



Avalon Bay, South Catalina Island. A beautiful island playground lying 20 miles off Los Angeles Harbor. Reached by steamer or air.

California Calls

When you come to the blue Pacific Shore in June of '54 you no doubt will have made all plans for your post-Conference sight-seeing. Although it may be possible to arrange last minute reservations for vacation tours it is always wise to make such preparations as far in advance as you are able.

You have been briefed already on the many attractions in and about Los Angeles and Los Angeles County; however, you may wish to extend your trip to include more of California, perhaps making a motor trip north up the coast highway to San Francisco. This is a beautiful scenic drive through fascinating towns such as Santa Barbara, Carmel, Monterey, Santa Cruz. and Palo Alto. While in the "North" you will want to visit awe inspiring Yosemite National Park as well as visit the Big Trees country.

A drive south from Los Angeles along the coast will take you through the many beach resort towns down to picturesque Laguna Beach. San Juan Capistrano Mission, beautiful La Jolla nestling in the hills by the sea and on to San Diego.

You may remember that from San Diego it is just seventeen miles farther south to Tia Juana, Mexico.

Speaking of Mexico—have you ever journeyed to Mexico City? Your local travel agency can tell you about the various tours in that direction.

For those of you who yield to the call of the Islands there are both sea and air cruises to Hawaii, "economy vacation" and "deluxe" style.

And, now, as we bid Aloha to the colorful vacationlands to the north, south and west we wish to introduce you to —

Hoolohe!

Aloha Nui Oe!

Hoolohe! will be your daily A.P.T.A. news sheet during Conference. It is our hope that this little paper will be of help to you during your stay in Los Angeles. We shall attempt to bring you information of Conference doings each day, important announcements, news items of interest. It will be *your* newspaper for the duration of Conference. Lets all support Hoolohe!

Reporters Wanted

Have any of you ever wanted to try your hand at cub reporting? Here is your chance. *Hoolohe!* would like one volunteer reporter from each

chapter to be responsible for news items, announcements, and society notes pertaining to his or her state group while at Conference. Will you bring this up at chapter meeting and definitely appoint a reporter to represent your group on *Hoolohe!*

Useful (?) Information Column

Due to the fact that your Southern California hosts and hostesses are becoming so imbued with the spirit of Hawaii while preparing for your entertainment in June we feel it may be helpful to prepare you for some of the peculiar sounding phrases they are beginning to fling about so glibly. If you will remember, even your reporter became somewhat "pupule" while writing this column last month.

Brief Glossary of Hawaiian Terms

Aloha	— Love, greetings, Farewell
Aloha Nui Oe	— A Great Big Hello to You
Aloha Kakou	— Greetings to all
Aloha Kakahiaka	— Good Morning
Aloha Auina la	— Good Afternoon
Bango	— Conference Badge
Hana	— Work
Hana Hana	— Hard work
Hele Mai	— Come here
Hele Pela	— Scram!
Holoholo	— Ride
Hoolohe	— Listen!
Mai e ai	— Come and eat
Makai	— Toward the sea
Mauki	— Toward the mountains
Mahalo a nui loa	— Thanks very much
Maika'i no wau	— I am well
Mehana	— Warm
Oluolu	— Cool
Pehea oe	— How are you?
Pau	— Finished
Poi	— Hawaiian "staff-of-life"
Pupule	— Off the beam—"tetched"

Special Course in Poliomyelitis

The Physical Therapy Department of the University of California, 3518 University Avenue, Los Angeles 7, California, in cooperation with the Los Angeles County General Hospital and Rancho Los Amigos Respiratory Center for Poliomyelitis, is sponsoring workshop-type studies in the treatment of the acute and respirator patient in the hospital and in the home.

The course will be offered during daily sessions June 21 through June 25, 1954 (one week prior to the annual conference of the American Physical Therapy Association) for one unit of graduate credit. For further information regarding the course contact Miss Charlotte W. Anderson, Chairman Physical Therapy Department.

A limited number of fellowships will be offered for properly qualified persons by the National Foundation for Infantile Paralysis. Applications will be accepted up to June 21 but not thereafter. Applications for fellowships must be received by April 26th if a decision of admission approval or rejection is to be made before the opening of the course. Application blanks may be obtained from: Division of Professional Education, The National Foundation for Infantile Paralysis, 120 Broadway, New York 5, New York.

The Spring Workshop Course, held in previous years, will not be offered this year.

Introduction to Technics of Neuromuscular Facilitation

The California Institute for Physical Medicine and Rehabilitation, formerly the Kabat-Kaiser Institute at Vallejo, California, announces an Introductory Course in Techniques of Neuromuscular Facilitation to be given from July 5–16, 1954, under the direction of Margaret Knott, Head Physical Therapist, and Dorothy E. Voss, Assistant Head Physical Therapist.

The course will include instruction in theory and practice of technics and an analysis of muscle function in patterns of facilitation. Opportunity will be given for practice under supervision and observation of treatment procedures used in physical therapy, gymnasium and gait activities.

The closing registration date will be June 1, 1954. Registration will be limited to twenty (20) graduate physical therapists who are members of the American Physical Therapy Association. Students will be selected as applications are received, but the right to select students on a geographical basis is reserved. Students should wear slacks. Each registrant will be sent mimeographed material for study before the course begins.

Those interested should write to Margaret Knott, Head Physical Therapist, California Institute for Physical Medicine and Rehabilitation, 2600 Alameda Street, Vallejo, California for further information including tuition rate and application.

Association Activities

Nominations for 1954-1956

The Nominating Committee submits the following slate for officers, directors and members of the Nominating Committee for 1954–1956:

Office	Name
President	Mary Nesbitt Barbara White
Vice-President	Lucille Daniels Agnes Snyder
Secretary	Clara Arrington Dorothy Graves
Treasurer	Viola Bryson Dorothy Hoag
Speaker of the House of Delegates	Jane Carlin Elizabeth Wood
Directors	Harriet Lee Sarah Rogers Margery Wagner Ada Winstanley
Nominations Committee	Carolyn Bowen Ruby Decker Florence Linduff Helen Vaughn Dorothy Voss Dorothy (Pat) Wagner

A biographical sketch of each candidate will appear in the next issue.

Mary Haskell on Field Trip

Mary Haskell, Associate Executive Director, spent the month of January in the field visiting the following chapters:

Northern California
San Joaquin Valley
Southern California
San Diego
Santa Barbara
Nevada
Colorado

Miss Haskell also met with Dorothy Graves, Chairman of Conference Program Committee and member of the Southern California Chapter in preparation for the Annual Conference to be held June 27 to July 2, at the Hotel Statler, Los Angeles.

Marriages

Anahid Chebookjian of Somerville, Mass., now Mrs. Anahid C. Savio, Ft. Belvoir, Va.

Madelyn Esposito of Old Forge, Pa., now Mrs. Madelyn Koehler, Quincy, Ill.

Sarah Zimmerman of Grand Forks, North Dakota, now Mrs. Sarah Z. Willert, Grand Forks, North Dakota.

Eleanor M. Kelly of Lowell, Mass., to Donald Lanoue, Valdosta, Ga.

Dolores Perregaux of Goshen, Conn., now Mrs. Dolores Morrison, Fort Worth, Texas.

Virginia Ross of Seattle, Wash., to Arthur Bratsberg, Seattle, Wash.

Martha J. Price of Fort Wayne, Indiana, to Jack Weyler, Fort Wayne, Indiana.

Lt. Gudrun Hofstad of Phoenixville, Pa., now Mrs. Gudrun Abolins, St. Albans, N. Y.

Ruth Ann Hamilton of Minneapolis, Minn., now Mrs. Ruth Blanchard, Minneapolis, Minn.

Lt. Mary M. Jackson of San Francisco, Calif., now Mrs. Mary Leach, Hobart, Indiana.

National Committee Meetings

The Advisory Committees on Education and Recruitment and a Committee to study the nature and function of the department of Professional Services in the National Office met in Highland Park, Illinois, the week of January 24.

State Examination for Physical Therapists

An examination for registration under the North Carolina Physical Therapy Practice Act will be given in Chapel Hill, North Carolina, on Friday, April 9, 1954. Application forms and further information may be obtained from Maria M. Kennedy, Secretary, The State Examining Committee for Physical Therapist, 123 West Seventh Street, Charlotte, North Carolina.

Operation Inspiration 1953

On Monday, August 31, 1953, the Pan American Plane Rainbow left Idlewild Airport at 3:30 p.m. Ten hours and fifty-nine minutes later it landed at the London Airport: 2:29 a.m. New York Time, 7:29 a.m. London Time. Then followed 43 days, 2 hours and 8 minutes divided up approximately as follows:

The First Congress of the World Confederation for Physical Therapy, London, September 7 to 12	14%
Visits to 18 hospitals, rehabilitation centers, factories and other institutions for disabled in England and Scotland	37
London theaters	21
Roman fountains	14
Paris paintings	14
	100%

Add another 100 per cent for British hospitality, and the trip emerges with ideals to emulate, standards to adopt, efficiency and organization to copy, seriousness of purpose and dignity of bearing to try to equal, and practical methods and equipment to study and acquire.

The First World Congress was heralded on Sunday, September 6th, by religious services at St. Paul's and Westminster Cathedrals. Next day the Chairman's finger turned on the spinning illuminated globe of the world which revolved through the remaining five days of the Congress. Polished speeches were given by the Right Honorable Iain N. MacLeod, M.P., Minister of Health, and other notables, with Miss Mildred Elson, President, topping all by her touching tribute to "the unseen guests, our patients."

As our National President Lee has so vividly reported in the January, 1954, Issue of *The Review*, delegates and members from 25 nations, including the 12 member countries, crowded Central Hall, Westminster. In fact, 1,750 registrants witnessed the well planned and conducted Program as it sped on through lectures, lively demonstrations, vital movies and unusually good papers on physical therapy in neuromuscular disorders (including a fine and well received presentation by our own Doctor Kabat and Miss Margaret Knott of Vallejo, California); rheumatic and chest diseases; antenatal training and obstetrics; paraplegia; postoperative heart conditions; injured shoulder; chronic postconcussion syndrome; and industry. The education of the physical therapist and a colorful account of physical therapy of non-European patients in South Africa, were two other subjects which stood out.

The paper entitled, "Gait Training for Patients with Multiple Sclerosis," by Miss Birgit Hanson of Denmark, illustrated various gait patterns with high canes used not for weight-bearing but for their sensory effect, contact with the floor immediately preceding the step of a limb. Four- and two-point gaits were shown, as well as "cross-walking." This effort is to be praised and can be duplicated by many of us as we screen and re-screen our patients for better and better group work. Patient and therapist gain and together contribute by this grouping of patients with common needs and a specific clinical study.

Group exercise was a particularly outstanding feature not only of the Congress demonstrations but at several institutions visited. At Garston Manor Rehabilitation Center, near London, patients are grouped, regardless of condition, into mat classes for total-body exercises; chair-seated classes for upper extremity and trunk exercises; chair-seated foot classes; heavy resistance exercise classes; ambulatory, standing, balance and gait classes; and advanced calisthenics classes. Classes have as many as 20 in them and are held in the open air when possible. Recorded music is usually used. Most patients wear side-zippered slack-type garments with elastic waistbands and loose shirts. Recreational activities such as ball games abound. At London Hospital, groups of not over four allow individual attention as well as the spirit obtained from group work. The program at Stoke-Mandeville Spinal Cord Unit, Aylesbury, stresses sports, which includes: extensive swimming in a modern new pool (all patients are reported bowel- and bladder-trained); wheel chair athletics on an international basis; and outdoor group calisthenics with dumbbell routines strongly advocated.

The 18 institutions visited were in London, Brighton, Aylesbury, Oxford, Birmingham, Oswestry, Droitwich, Glasgow, and Edinburgh. They are listed below according to type, and their names and addresses would be supplied gladly to anyone who might be contemplating a similar trip.

General hospitals	9
These general hospitals offer and emphasize the following special units or projects which were of particular interest to this physical therapist:	
Maternity	1
Amputations	1
Schools of physical therapy	2
Spinal cord injuries	1

Neurological research department	1	
Geriatrics	1	
Rheumatoid arthritis	1	
Chest	1	
Special hospitals:		
Orthopedic (two of these have schools of physical therapy)		3
Geriatrics		1
Rehabilitation centers (one in the Austin Motor Works, Birmingham)		2
Private practice (Brighton)		1
Vocational training school		1
Spa		1
		18

Miss Dorothy Worsfold, Chartered Physical Therapist and Development Officer for the Central Council for the Care of Cripples, not only arranged the tour through the Midlands of England but also the special visits in Scotland going so far in her kindness as to obtain a ticket for a bus trip shooting northward from London to Glasgow through fifteen hours and twenty counties worth of poetic pastoral countryside.

Faced with the problems of developing physical therapy in a 2,000-bed New York City Hospital for Chronic Diseases, with the possibilities of a physical therapy school, this reporter has selected the following four subjects from the mass of information and ideas obtainable from such a trip: Amputations, spinal cord injuries, schools of physical therapy and conjuring as reinforcement to exercise.

I. Amputations: Queen Mary's (Roehampton) Hospital, London

Experience through two world wars and with their current 30,000 amputees, brings out that,

A. Physical therapists should watch the operations and receive instructions directly from the surgeon.

B. No massage should be used, except to scar tissue, as it tends to make stumps sensitive.

C. Exercises for the whole body and just as much for the elderly are usually beneficial.

D. As soon as the stump is healed, tightly and skilfully applied compression bandaging is indicated by means of Royalast Rayon Elastic Crepe Bandages. These should be 6 inches wide for above the knee and of double length making sewing together unnecessary; 4 inches for below the knee and 3 inches for upper extremities. They should be applied three times a day and kept on all night. Bandages in plenty belong to the Physical Therapy Department, are applied by physical therapists, are rinsed out in water to induce elasticity after every wearing, and are kept in the Physical Therapy Department.

E. Individually made plaster pylons are good for use while shaping of stumps takes place, and two canes are used to promote symmetry of gait.

F. A limb-fitting center should be on the premises.

G. "Stubbies," short non-jointed prostheses to allow upright locomotion activities, are advocated in case of multiple disease conditions and flexion and abduction contractures prohibiting usual artificial limbs.

H. Good attributes for wheel chairs are, large wheels in front, leather-covered and stuffed seat and arm rests, brakes, wooden wheels for self-propulsion, and troughs to pull out for feet. British wheel chairs are heavy and non-collapsible and do not tip over as the American collapsibles tend to do.

II. Spinal Cord Injuries: Stoke-Mandeville Hospital, Aylesbury

Experience with 150 beds and 950 spinal-cord-injured reveals some treatment highlights as follows:

A. Four orderlies turn new patients every two hours. Stryker frames are used only for transporting patients. Mountainous beds contain blankets raised and propped off patient who lies on three layers of foam rubber cut into blocks of different sizes and shapes according to needs of individual patient and blocks wrapped in rubber sheeting, all resting on a wooden board on the bed spring. The blocks make possible the arrangement of gaps in the top surface, individually fashioned for parts of body susceptible to bed sores. Pillows prop also. Bed sores are reported not to develop. If bed sores are present on arrival, a program of operations, blood transfusions and high protein diet with no ultraviolet is followed. This program is available in movie form.

B. This center emphasizes trunk balance and strength and the intensive cultivation of the latissimus dorsi muscle which escapes damage because of its high innervation. The patient stabilizes his shoulder region grabbing onto the table top in a supine position. His lower

extremities and pelvis are suspended in Guthrie-Smith apparatus slings, and he learns to swing his pelvis and lower extremities vigorously from side to side first with no resistance then with the tension of Guthrie-Smith graduated measurable tension springs.

C. Long double lower extremity braces are used without pelvic bands. The patients are expected to learn only enough locomotion upright to enable a few steps to be taken. They are trained for wheel chair lives, and apparently the British economy allows for this. Wheel chairs and motorized vehicles for outdoor use are supplied by the Ministry of Health. Special daily activity training seems to be at a minimum. Neither agility nor finesse is required even in emerging from a chair.

III. Schools of Physical Therapy: London Hospital; Royal Infirmary, Glasgow; Royal Orthopedic, Birmingham; Robert Jones and Agnes Hunt Orthopaedic Hospital, Oswestry.

A talk with Miss Dorothy Brown, Consultant on Education for the Chartered Society of Physiotherapy, together with visits to the above schools netted the following interesting points: There are 31 schools. The London Hospital School presented an exceedingly well arranged demonstration of individual and group exercises for Congress Members on September 9. Sixteen sets of conditions were displayed with a typed program containing a lettered and numbered key for the guidance of the observers. A student in charge of each activity conducted the exercises and answered questions. Miss S. G. Orme, Director of the London School of Physiotherapy, explained that planning and conducting demonstrations are parts of student training.

The great proportion of courses in schools of physical therapy, including preliminary anatomy and physiology, is taught by physical therapists. The Chartered Society is the approving body and administers all examinations. There are 19,000 physical therapists in England, Scotland and Wales. This number is insufficient, and jobs are freely available. There is a dearth of trained teachers (240 are registered) in spite of teachers' training schools which prepare teachers for certificates without which none can teach. Teacher training includes public speaking, supervision, and administration. The standards are high and are reflected in the well conducted and smoothly-running programs observed.

IV. Simple conjuring as reinforcement to exercise for the upper extremities, especially the hands: Royal Infirmary, Glasgow.

Mr. Alec Stewart ("Devega" on the Scottish stage) is a magician turned physical therapist, who fascinates students and patients with his simple tricks specially selected from his conjuring repertory. A "hands-across-the-sea" project is under development.

MARY ELEANOR BROWN,
Chief of Physical Therapy,
Bird S. Coler Hospital,
Welfare Island, New York City.

The Physical Therapy Review

Address Changes and Postal Regulations

Address changes must be in the *Review* office at least six weeks before the change is to take place to insure uninterrupted delivery of your *Physical Therapy Review*.

This is why

Four weeks are required to remove the old stencils, cut new ones, and insert them alphabetically and geographically. Another week is required to print the wrappers.

The *Review* staff processes several hundred address changes each month. When the address change is received six weeks prior to the reader's removal from the old address, the *Review* can be mailed on schedule, otherwise delays occur and the magazines are destroyed. *Second class mail is not forwarded* by the post office unless special instructions are given.

On February 1, the cost of notices to the editorial office from the post office regarding its inability to deliver magazines (due to: "moved," "unknown," "moved, left no forwarding address," or "left this forwarding address"), was increased from two cents to three cents each. This does not include the cost of returning the magazine to the publisher.

If your magazine is not arriving regularly, notify the *Physical Therapy Review* so that the address can be checked and the cause determined.

Membership News

Gertrude Beard started her new position as Chief Physical Therapist at the Bethany Hospital, Kansas City, Kansas, on January 1.

BOSTON UNIVERSITY SARGENT COLLEGE OF PHYSICAL EDUCATION

Established in 1881 as the Sargent School for Physical Education, Boston University Sargent College of Physical Education is one of the oldest schools of its kind in this country. Its organizer, and director in the early days, was Dr. Dudley Allen Sargent, a world-renowned pioneer in the field of physical education. In 1929, the Sargent family tendered the school to Boston University. In 1933, upon vote of the Trustees of the University, it became an integral College of Boston University.

Sensing the developing need for physical therapists, the College offered a course in physical therapy to a limited number of students in 1931. The first class majoring in physical therapy was graduated in 1933.

From the outset, the course in physical therapy at Sargent College has enjoyed a high degree of cooperation with the Boston University School of Medicine. Dr. Louis G. Howard (member of the faculty of the University School of Medicine and prominent Boston orthopedist) was the first medical director. Miss Lucille Washburn of the faculty of Sargent College was the first technical director.

The course was early approved by the American Physiotherapy Association, (now called the American Physical Therapy Association). It was included on the first list of approved schools published in the *Physiotherapy Review*, September–October, 1936, among the thirteen schools on the approved list at that time. It has enjoyed accreditation ever since.

For the first 15 years, the enrollment was 17 students or less. Beginning in 1945, increased clinical opportunities were established, additional equipment provided, and new faculty members added to the department, so that now approximately 40 students are admitted to the program each year. Beginning with the autumn of 1953, a limited number of men students are being received into the program. These men students matriculate for degrees in the Boston University School of Education.

Currently, the program is conducted under the Deanship of George K. Makechnie, with Professor Adelaide L. McGarrett as Physical Therapy Director and Dr. Kenneth Christophe, an orthopedist and member of the Boston University School of Medicine, as Medical Director. In addition, Assistant Professor Ruth Langley and Miss Helen K. Hickey serve on the faculty full-time. Their teaching is augmented by other members of the Sargent College faculty and doctors of the School of Medicine.

Six hundred hours have been determined as minimal in clinical practice. Fourteen clinical affiliations have been established in the Greater Boston Area, including:

American Mutual Clinic
Bay State Medical Rehabilitation Clinic
Peter Bent Brigham Hospital
Robert Breck Brigham Hospital
Holy Ghost Hospital
Kennedy Memorial Hospital
Massachusetts General Hospital
Massachusetts Memorial Hospitals
Mount Auburn Hospital
Murphy Army Hospital
The Rehabilitation Center
U. S. Public Health Service Hospital
Veterans Administration Hospital
Veterans Administration Physical Medicine Unit

In addition to these, students are assigned to more distant areas for clinical work immediately upon the close of the second semester. Currently, students in the summer period have been affiliated with the following:

Cushing Veterans Administration Hospital
Framingham, Massachusetts

Duke University Hospital
Durham, North Carolina

Grace-New Haven Hospital
New Haven, Hospital

Hitchcock Clinic
Hanover, New Hampshire

House of St. Giles the Cripple
Brooklyn, New York

Kessler Institute
West Orange, New Jersey

Newington Home and Hospital for Crippled Children
Newington, Connecticut

Rehabilitation Hospital
West Haverstraw, New York

Enrollment in the physical therapy major course is limited to candidates with high academic achievement, particularly in the basic biological, physical, and social sciences. Also, candidates must demonstrate satisfactory personality adjustment and show genuine aptitude for the work.

The College is grateful for the confidence of the National Foundation for Infantile Paralysis which has granted scholarships generously to its students over the last decade, and the Kellogg Foundation which has established a substantial scholarship loan fund.

Students are accepted for major work in physical therapy in one of the following three ways:

The physical therapy student treats a cerebral palsy child.

(1) For a four-year degree course with a major in physical therapy:

Candidates satisfy the entrance requirements of the College. During the last two years of the four-year curriculum the major portion of the physical therapy course is completed. Students who satisfactorily complete the four-year course in physical therapy are awarded the degree of Bachelor of Science. Acceptance in the course does not necessarily follow admission to the College, but is dependent upon the suitability of the student for the work and on the scholastic achievement in prerequisite and fundamental courses.

(2) For a two-year course in physical therapy:

Candidates must have completed a minimum of 60 semester hours at an accredited college or university, this to include at least 15 semester hours' credit in biological (Anatomy, Physiology, Biology, etc.) and physical sciences (Chemistry and/or Physics) and 12 semester hours' credit in social sciences of which 6 semester hours' credit must be in Psychology.

(3) For a twelve-month course in physical therapy:

Candidates must have completed a minimum of 90 semester hours at an accredited college or university, this to include at least 15 semester hours' credit in biological (Anatomy, Physiology, Biology, etc.) and physical sciences (Chemistry and/or Physics), and 12 semester hours' credit in social sciences of which 6 semester hours' credit must be in Psychology.

This twelve-month course is open to a limited number of well qualified candidates. The course is essentially an accelerated one, combining the didactic work of the Junior and Senior programs during the academic

Clinical teaching in activities of daily living.

year. Hospital practice is completed in full-time assignments during the last three months.

The Boston University Sargent College Physical Therapy Program affords at once the advantages of a large university with those of the small college. On the one hand the program is enriched by the resources of a great university; on the other hand the College is small enough to permit a nurturing mood of close working and living relationships between student and student, and between student and faculty member. Boston University gives honored place to its work in physical therapy.

Graduate Courses

The Physical Therapy and Occupational Therapy Departments of the University of Southern California, Los Angeles, California, are offering two graduate courses during the summer session June 21 to July 31, 1954.

Physical Therapy 501, Dissection Anatomy for the Therapist, with 3 units of graduate credit, is offered daily Monday through Friday, 8:30 to 12:00.

Occupational Therapy 471 Advanced Kinesiology, with 2 units of graduate credit, is presented Monday through Thursday, 1:15 to 3:30.

For further information regarding fees and registration write either the Physical Therapy or Occupational Therapy Department, University of Southern California, University Park, Los Angeles 7, California.

Student Section

Since graduation is always uppermost in the mind of a student, perhaps you will enjoy this article which we received recently.

Typical Graduate 1953

Last June, as an about-to-graduate physical therapist from Columbia University, my outlook for a first job seemed hazy — being draft eligible. With a granted deferment, however, it was possible for me to apply for an NFIP polio emergency assignment which our Professional Consultant, APTA's Ruth Whittemore, quickly facilitated.

A fresh fledgling, on my arrival in Montgomery, Alabama, I supplemented the only other physical therapist at St. Jude's Hospital. This general hospital had no PT Department prior to the Montgomery County polio epidemic outbreak last June, and consequently there was no equipment available, with the result that our treatments consisted solely of stretching and manual muscle reeducation. The nursing staff, ably assisted by volunteers, applied hot packs. Our peak average during the emergency was 20 ward cases and 14 outpatients per day. After fulfilling the three-months temporary assignment, I flew back to New York City for a week's vacation.

Promptly, my second polio assignment was beamed towards North Carolina to the Central Carolina Convalescent Hospital at Greensboro — one of the few strictly polio centers. This PT Department is ideally equipped for all aspects of polio care and is well organized with eight staff therapists, seven aides, and two office secretaries. The 80-odd ward patients receive individual treatment, usually for 20 minutes at a time. Each physical therapist, averaging responsibility for 13 patients, has the working day scheduled for table exercises, pool treatments, and gym functional activities.

Just the other day, notice arrived of my

reclassification to 1-A draft status. And so, being a qualified Physical Therapist, male, with a background of five college years, it will be any day now that the US Army will utilize me as a Buck Private — let us hope in a physical therapy department.

MANFRED HERMANN HECHT

Graduation has many advantages, but it also has some disadvantages. Many of us who have watched this section grow into a reality, not a dream, have now left our student days, and it is time for us to turn our work over to those who are coming along behind us. It isn't easy, collecting ideas from all over the country and putting them together, but Martha Eigen, of University of Connecticut, Jack Gamet, of Duke, and Rosella Allen, of St. Louis University, as members of the first editorial staff have really done a terrific job. The individual school reporters have also helped a lot, by sending us the latest reports on the future PT's of America.

After careful deliberation, we have selected six students to carry on. They are:

Chairman —
Marion Kroupa, University of Southern California
Assisted by —
Violet Schneider
Fay Edsall, University of Connecticut
Roy Mosman, Medical College of Virginia
Rosella Allen, St. Louis University
Margery Greenfield, Columbia University

We wish them all the best of luck in the coming year and we hope they will enjoy the work as much as we have.

BETTE LANDON, *Chairman*
Medical College of Virginia, '53

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General News

Polio Vaccine Trials

Due to delays in the manufacture of the trial polio vaccine the nationwide validity tests are expected to get under way in late March or early April, it was announced today by Basil O'Connor, president of the National Foundation for Infantile Paralysis.

Mr. O'Connor said it had been hoped that the injection of school children taking part in the tests could begin in February, but he added:

"We have been confronted with some of the usual production problems that have to be expected in the manufacture of any new product. Added to these has been the length of time required to check and re-check the many processes involved in converting the results of any laboratory research into commercial production on a large scale. None of the problems encountered is insuperable and all are being rapidly solved."

Mr. O'Connor also said: "While production problems have postponed the date for the start of the trials, we plan to inoculate a sufficient number of children before June to determine scientifically the value of this product."

Preparation of large quantities of a trial vaccine involves a series of complicated steps, Mr. O'Connor explained.

"The virus is grown in tissue culture, a new technic," he stated. "Most of it is grown at the Connaught Medical Research Laboratories of the University of Toronto, where the tissue-culture process has been studied since 1949 under a grant from the National Foundation. More than sixty different ingredients are used to grow the virus in tissue culture," he said.

Polio virus grown in this way is shipped to pharmaceutical and biological concerns for conversion into vaccine, which requires several weeks.

Each lot of the vaccine is subjected to safety tests by three independent laboratories: the manufacturer's laboratory, the Virus Research Laboratory of the University of Pittsburgh and the Laboratory of Biologics Control of the National Institutes of Health in Washington.

The vaccine to be tested was developed under a March of Dimes grant by Dr. Jonas E. Salk of the University of Pittsburgh and is currently being produced on a nonprofit basis by Cutter Laboratories, Berkeley, Calif.; Eli Lilly and Co., Indianapolis; Parke, Davis & Co., Detroit; Pitman-Moore Co., Indianapolis; and Wyeth Laboratories, Philadelphia.

Dr. Salk announced recently that he was extending his studies to at least 5,000 persons in Allegheny County, Pennsylvania, before the start of the National Foundation field trials. He was unable to resume this work earlier because polio cases continued to occur through December in that area.

A small amount of the commercially-produced vaccine will be available for Dr. Salk's studies in February, it is believed, but the large quantities needed for the field trials cannot be processed, tested and packaged for shipment before the last week in March, Mr. O'Connor said.

The vaccine trials are being organized with the advice of the National Foundation's scientific committees and that of special committees appointed by the Association of State and Territorial Health Officers, with Dr. Hart E. Van Riper, National Foundation medical director, in charge of the project. The test areas are being selected upon recommendation of individual State Health Officers, based on scientific criteria.

Lists of all eligible counties are being compiled and studied, Mr. O'Connor said, but the final number chosen must depend upon the supply of trial vaccine available.

Mr. O'Connor said the National Foundation has received excellent cooperation from all state health officials in planning the tests.

"However," he said, "no final determination of locations of trial areas can be made at this time and no definite commitment will be asked of any health officer until Dr. Salk completes his additional 5,000 inoculations in Allegheny County."

Appointed to Mayor's Cabinet

Belle Greve, former Director at the Cleveland Rehabilitation Center, has joined the Cleveland Mayor's Cabinet as Director, Department of Health and Welfare.

New Concept of Rehabilitation Training

Field Workshop

A new, broad concept of rehabilitation training designed to meet the needs of professionals and graduate students in rehabilitation will be utilized for the first time on June 1, 1954, when Teachers College, Columbia University, and the Institute for the Crippled and Disabled, multifunctional rehabilitation center in New York City, join in conducting a three and one-half week Field Workshop in Rehabilitation Teamwork.

A maximum of 35 professionals already trained and experienced in their own disciplines will be admitted to the course. This group will be divided into closely knit, balanced, rehabilitation teams which will include experienced staff personnel of the Institute. These teams will function as dynamic educational units within the Field Workshop.

The curriculum for the workshop was developed by Columbia and the Institute through the professional affiliation which joins the two organizations. The Institute for the Crippled and Disabled is the nation's pioneer rehabilitation agency. Since its founding in 1917, its staff has developed much of the philosophy and technics of modern rehabilitation. The curriculum will include:

Field Experience: Each participant will be assigned to a supervisor within the Institute for the Crippled and Disabled whose responsibilities are related to the participant's discipline. Enrollees will function as internes in the rehabilitation center with actual cases assigned to them. Among the types of disabilities with which enrollees will have experience are bone, joint and muscle diseases, amputees, industrial accidents, polio, spinal cord damage, hemiplegia, cerebral palsy, and circulatory diseases.

Rehabilitation Seminars: Conducted under the auspices of the Department of Special Education, Teachers College, these seminars will relate participants' day-to-day field experience to the major ideas and issues in current rehabilitation practice. The seminars will be student-centered and will focus upon the practical pressing problems which confront participants in their home agencies.

Daily Case Conferences: The participants will present the case problems they encounter each day to their respective rehabilitation teams. Jointly supervised by the Institute and the University, staff members of both organizations will attend these conferences to participate and serve as reference sources.

Individual Counseling: Periodically throughout the course participants will be scheduled for special sessions with Institute staff professionals to discuss progress and problems.

Guest Lectures: Authorities on rehabilitation subjects of interest to the participants will be scheduled for lectures during the course. In this and other phases of the program, the Workshop will benefit from the cooperation of leading professional rehabilitation organizations and their most prominent members.

Other facets of the Workshop program include social events, tours of other rehabilitation agencies in the New York area, and informal discussions of topics of mutual interest.

A limited number of participants from each of the disciplines included in a complete rehabilitation team will be admitted to the Workshop. To be eligible, an applicant must be a professional in one of the following disciplines or specialties: physical medicine and other medical specialties interested in rehabilitation; psychiatry; physical therapy; occupational therapy; psychology; special education; vocational counseling; special placement; social work; sheltered workshop supervision; speech therapy; orthopedic and prosthetic appliance making; and agency administration.

Special consideration for admission will be given to a group of applicants from the same agency or organization who, together, make up a rehabilitation team or a substantial part of one. Students from nations other than the United States will be accepted. Applications must be mailed on or before April 15, 1954 in order to be eligible for consideration.

Enrollees who meet the entrance requirements of Teachers College will be given the opportunity of earning three graduate credits in taking the Workshop Course. This is not, however, a requirement for enrollment. Total fee for the course is $100.00. This includes $75.00 for tuition, a $7.00 Columbia University fee and $18.00 to cover the costs of books, syllabi, pamphlets and mimeographed material which will be given to students. Living, transportation, recreation and such other expenses as the participant may incur are not included in this fee.

The co-directors of the Field Workshop in Rehabilitation Teamwork will be Dr. Maurice H. Fouracre, Chairman, Department of Special Education, Teachers College, Columbia University, and Willis C. Gorthy, Director, Institute for the Crippled and Disabled. The coordinators of the Field Workshop are: William Usdane, Director

of Vocational Rehabilitation, Institute for the Crippled and Disabled; and Dr. Herbert Rusalem, member of the staff of the Department of Special Education at Teachers College.

Applications for admission to the Workshop must be filed prior to April 1, 1954. Further information and application blanks may be obtained by writing to Dr. Maurice A. Fouracre, Teachers College, Columbia University, New York 27, N. Y.

Sixth World Congress for Welfare of Cripples

Persons from all parts of the world interested in services for the disabled will assemble at The Hague, Netherlands, from September 13 to 17, 1954, for the Sixth World Congress of the International Society for the Welfare of Cripples.

Representatives of the 26 national organizations which are members of the International Society are expected to attend the Congress, as well as representatives of the United Nations, World Health Organization and other governmental and non-governmental organizations interested in services for the physically handicapped.

The Congress will be held under the joint auspices of the ISWC and the Netherlands Central Society for the Welfare of Cripples, the affiliated national organization in Holland of the ISWC.

The program will present through plenary sessions, demonstrations, panel discussions and special meetings analyses of developments throughout the world in services for the disabled and means for furthering such services in the medical, social, educational and vocational fields.

Mr. J. M. Ravesloot, President of the Netherlands Society and Mayor of the city of Almelo, has been designated President of the Sixth World Congress.

The International Society for the Welfare of Cripples is a federation of national voluntary organizations providing services for the physically handicapped children and adults. Founded in 1922, it has, for many years, been the outstanding organization of its type in the international field.

The Society's program includes all phases of rehabilitation of the disabled—prevention, medical services, education, social services, therapy, recreation, and employment. It serves as an international clearing house for information concerning technical and social developments in rehabilitation services for the handicapped.

Any physical therapist desiring to attend the Sixth World Congress may obtain additional information from the Society's Headquarters, 127 East 52nd Street, New York 22, N. Y. — Mr. D. V. Wilson, Secretary General.

Pamphlet Published by Child Research Clinic

The complete proceedings of a conference held at the Bellevue-Stratford Hotel, Philadelphia, last May on the training and education of the retarded child have just been published as a 70-page pamphlet, and may be obtained without charge by writing to the Child Research Clinic of The Woods Schools, Langhorne, Pennsylvania.

Titled "The Pre-Adolescent Exceptional Child," the pamphlet is the second of a series of conference reports on medical and psychological diagnosis, care, treatment and training, and education and social adjustment problems of the mentally-retarded, emotionally-disturbed child, from birth through adolescence.

Employment Records of Physically Handicapped Studied

Among the rehabilitated physically handicapped, victims of polio are the most successful in securing gainful employment. The cerebral palsied are the least successful. Persons disabled at birth are the least likely to be successful in finding jobs, while persons disabled after birth but before the age of 30 are the most successful.

These are some of the results revealed in a three-year research study of the status in the community of some 500 physically disabled persons who were rehabilitated at the Institute for the Crippled and Disabled, rehabilitation center in New York City.

According to Willis C. Gorthy, Institute Director, the study arose from the necessity for evaluating rehabilitation procedures and understanding the ways in which physically handicapped persons function in their communities.

The full results of the study, which was sponsored by the Institute for the Crippled and Disabled and the Columbia University College of Physicians and Surgeons under a Bernard Baruch grant, are contained in a nine-chapter report.

The study was directed by Mrs. Marion S. Lesser of the Research Staff of the Institute for the Crippled and Disabled, and Dr. Robert C. Darling of the Department of Physical Medicine and Rehabilitation, College of Physicians and

Surgeons, Columbia University, and Chairman of the Institute's Medical Board.

Two groups of physically disabled people, formerly patients or students at the Institute, were sought out and interviewed concerning their vocational, social and physical status. The groups were separated by a ten year time interval in their rehabilitation experience. The first group was comprised of 264 people discharged from the Institute in 1940 and 1941, and the second group consisted of 267 persons discharged in 1948 and 1949.

Of the first group 71 per cent were gainfully employed at the time of the follow-up interview in 1951, as compared with 41 per cent of the more recently discharged group.

In both groups polio patients were the most successful, with 82 per cent of the earlier group and 71 per cent of the later group finding employment.

Cerebral palsy patients were the least successful with 61 per cent of those discharged in 1940-41 finding employment and only 22 per cent of those discharged from the Institute in 1948-49.

Slightly over 70 per cent of the amputees in the 1940-41 group found employment as compared with one-third of the 1948-49 group. In comparing the two amputee groups, the researchers said that the 1940-41 cases were younger at the time of disablement and that their handicaps were less complicated. This, they said, is one of the reasons why a much larger percentage of the earlier amputee group has found and held employment.

The researchers found that practical experience in the community is of great value in promoting vocational achievements. The handicapped whose rehabilitation had taken place ten years prior to being interviewed for this study were consistently more successful in getting and holding jobs than those, equally disabled, in the 1948-49 group.

Through its comparison of the two groups of disabled people, the study shows that modern rehabilitation centers are treating a generally more severely disabled group today than they were ten or more years ago.

The study also revealed that community attitudes toward the disabled have, during this period, improved so that in most cases the mildly disabled need no longer seek out the special services of a rehabilitation center, but can go directly into competition with the able-bodied.

Investigation of factors which increase rehabilitation potential revealed that intelligence, education, and physical independence all have a positive influence on employment success. Handicapped persons who do best in finding and holding employment are those who have achieved physical independence despite disability, who have normal intelligence, and who at least have partially completed high school.

Vocational Rehabilitation Costs Self-Liquidating

Mary E. Switzer, vocational rehabilitation director in the Department of Health, Education, and Welfare, reports that for the third successive year the state-federal program which she supervises enabled more than 60,000 physically handicapped persons to become self-supporting. Actual figure for the fiscal year which ended June 30, 1953, was 61,308, approximately one-fifth of whom had been on public relief rolls. It cost $3,000,000 to rehabilitate these indigent handicapped for employment, compared with $8,000,000 to maintain them on relief for one year.

Emphasizing that vocational rehabilitation is self-liquidating, Miss Switzer estimated that the men and women returned to employment in 1952-53 will pay back federal income taxes at an annual volume of approximately $10,000,000. Thus in less than two and one-half years they will restore the $23,000,000 that was invested by Treasury (states contributed $11,600,000 for the year).

Dr. Howard A. Rusk Receives Award

Dr. Howard A. Rusk, has been selected by the Board of Directors of Save the Children Federation to receive the SCF Fourth Annual Award in recognition of distinguished and devoted service in the field of health and welfare for children."

The Award, the highest honor which the Federation can confer, was presented to Dr. Rusk by Mr. Leonard Mayo, Director of the Association for Aid to Crippled Children, at the Federation's 22nd Annual Meeting dinner in the United Nations Building on Tuesday, January 19.

Previous recipients of the SCF Annual Award include Mr. Mayo, Dr. Benjamin Fine, Education Editor of the New York Times, and Dr. Willard E. Givens, formerly Executive Secretary of the National Education Association.

Founded in 1932, the Save the Children Federation is a child service organization with national headquarters at 345 East 46th Street, New York City. It helps children both in the United States and overseas.

Dr. William P. Shepard Heads National Health Forum

Dr. William P. Shepard, vice president of the Metropolitan Life Insurance Company, has been appointed chairman of the National Health Forum which will feature the National Health Council's 34th annual meeting March 24 to 26 in New York City.

Dr. Shepard is a member of the Health Resources Advisory Committee, Office of Defense Mobilization, and is a former president of the American Public Health Association and the National Tuberculosis Association. He was for twenty-five years clinical professor of public health and preventive medicine at Stanford University Medical School.

Health, education, and personnel leaders from all over the United States are expected to attend the Forum to discuss changing factors in staffing America's health services.

"Adequate staffing of health services requires intelligent and aggressive effort in three areas," said Dr. Shepard. "Interesting young people in entering the health professions is only the beginning. We must have enough educational facilities of the right kind to prepare them for the tasks that need doing, and long range employment plans that will keep the trained workers in health fields. Together these three areas constitute a major challenge of the times."

Dr. Shepard cited the rapid increase in the number and variety of paramedical fields, the changing military requirements, the growing emphasis on rehabilitation, and more marriages among students as some of the "changing factors" to be considered at the Forum.

"A coordinating body of 42 national organizations and professional societies in the health field, such as the Council, is eminently fitted to give the young people of our country a comprehensive view of what health service asks of them and can offer," said Dr. Shepard. "We hope that the March meeting can devise a mechanism for taking something like a yearly inventory of the status of the health professions, to guide young people and their vocational counselors."

Equal Pay Bill

Congressman Frances P. Bolton has introduced a bill to provide that equal wages shall be paid for comparable work, regardless of the sex of the worker.

"There would be about 31 per cent of the working population of America affected by such legislation since latest U. S. Labor Department reports show a labor force of 63.4 million with 19.6 million of them women."

The bill would make it unlawful to pay wages to one employee at a rate less than that paid to another of the opposite sex if their work is of comparable character on jobs requiring comparable skills. Mrs. Bolton's bill would not affect wages paid on seniority or merit increase systems.

Congressman Bolton, noted for her leadership in the fields of nursing and health legislation, said that her bill was the result of a year of study.

She also sought the advice of 1,000 leaders in American labor, business, education, and women's affairs. Replies to the Congressman's survey indicated that almost all agreed with the principle of equal pay and a large majority were in favor of a Federal law to enforce it.

The bill also:

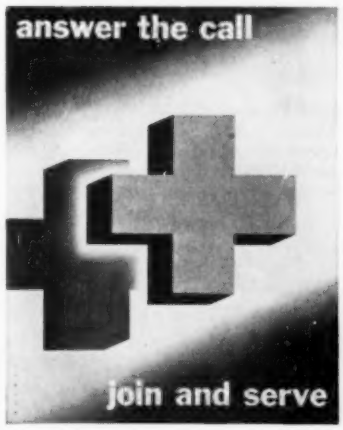
1. Directs the Secretary of Labor to set up standards to determine which jobs involve work of comparable character or skills.

2. Permits an employee to sue for wages he was deprived of because his employer violated the act.

3. Permits the Secretary of Labor to bring such court action if the employee prefers that method.

4. Prohibits an employer from firing or discriminating against an employee who sues or testifies under the act.

5. Provides for injunctions against violators of the act.



Schools of Physical Therapy

APPROVED BY THE COUNCIL ON MEDICAL EDUCATION AND HOSPITALS
OF THE AMERICAN MEDICAL ASSOCIATION

Graduates of these schools are eligible for membership in the American Physical Therapy Association.

California

School of Physical Therapy
Childrens Hospital Society
4614 Sunset Blvd., Los Angeles 27
(Univ. of California, Los Angeles)

School of Physical Therapy
College of Medical Evangelists
White Memorial Hospital
Boyle & Michigan Aves.
Los Angeles 33

Department of Physical Therapy
University of Southern California
University Park
Los Angeles 7

Curriculum in Physical Therapy
School of Medicine
University of California
3rd & Parnassus
San Francisco 22

Division of Physical Therapy
Stanford University
Stanford

Colorado

School of Physical Therapy
Department of Medicine
University of Colorado
4200 East Ninth Ave.
Denver 7

Connecticut

School of Physical Therapy
University of Connecticut
Box U 101
Storrs

Illinois

School of Physical Therapy
The Medical School, Northwestern University
303 East Chicago Ave.
Chicago 11

Iowa

†Department of Physical Therapy
State University of Iowa
University Hospitals
Iowa City

Kansas

School of Physical Therapy
University of Kansas — Medical Center
Kansas City 3

Louisiana

†Charity Hospital School of Physical Therapy
1532 Tulane Ave.
New Orleans

Massachusetts

*Course in Physical Therapy
Bouve-Boston School
Medford 55
(Tufts College, Medford)

*Program in Physical Therapy
Simmons College
Children's Medical Center
300 Longwood Ave.
Boston 15

Department of Physical Therapy
Boston University
Sargent College
6 Everett St.
Cambridge 38

Michigan

Curriculum in Physical Therapy
Dept. of Physical Medicine & Rehabilitation
University Hospital
University of Michigan
1313 East Ann St.
Ann Arbor

Minnesota

Course in Physical Medicine
The Medical School
University of Minnesota
Minneapolis 14

†School of Physical Therapy
Mayo Clinic
Rochester

Missouri

Department of Physical Therapy
Division of Auxiliary Medical Services
School of Medicine
Washington University
Barnes Hospital
600 S. Kingshighway
St. Louis 10

Division of Health & Hospital Services
St. Louis University School of Nursing
1402 South Grand Blvd.
St. Louis 4

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* Only women accepted.
† Only certificate awarded.

New York

Physical Therapy School
Albany Hospital
New Scotland Ave.
Albany 1
(Russell Sage College, Troy)

Program in Physical Therapy
University of Buffalo
2183 Main St.
Buffalo 14

Division of Physical Therapy
College of Physicians & Surgeons
Columbia University
630 W. 168th St.
New York 32

Curriculum in Physical Therapy
School of Education
New York University
Washington Square
New York 3

North Carolina

Division of Physical Therapy
School of Medicine
Duke University
Durham

Ohio

School of Physical Therapy
The Frank E. Bunts Educational Institute
Euclid & East 93rd St.
Cleveland 6
(Cleveland Clinic)

Pennsylvania

†The D. T. Watson School of Physiatrics
Leetsdale

Division of Physical Therapy
School of Auxiliary Medical Services
University of Pennsylvania
1818 Lombard St.
Philadelphia 46

Texas

†Grady Vaughn School of Physical Therapy
Baylor University Hospital
Dallas 1

†School of Physical Therapy
Hermann Hospital
Houston 5

School of Physical Therapy
The University of Texas — Medical Branch
Galveston

Virginia

Physical Therapy School
Baruch Center of Phys. Med. & Rehabilitation
Medical College of Virginia
Richmond 19
(Richmond Professional Institute)

Wisconsin

Section in Physical Medicine
Medical School
University of Wisconsin
Madison

U. S. Army Medical Service

†* Physical Therapy Course

Medical Field Service School
Brooke Army Medical Center
Fort Sam Houston, Texas and
Brooke, Letterman, and Walter
Reed Army Hospitals

Write to: The Surgeon General
Department of the Army
Washington 25, D. C.
Attention: Personnel Division

* Only women accepted.
† Only certificate awarded.

Please direct all inquiries regarding tuition, entrance requirements and other specific information to the school and *not* to the American Physical Therapy Association.

Our Book Reviewers for March

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Abstracts

Exteroceptive and Proprioceptive Ascending Impulses in Pyramidal Tract of Cat

Alf Brodal and Birger R. Kaada, J. NEUROPHYSIOL., XVI:567-586, November 1953.

It has been generally assumed that the pyramidal tract is a descending pathway. Indeed, among the wealth of new data brought forward in recent years, necessitating constant revisions of our concepts of this important pathway, its purely descending course seems to have been the only fact which has remained unchallenged, as appears from Sarah Tower's review of 1949. However, even this conception is no longer tenable, since Brodal and Walberg experimentally have demonstrated the presence of ascending fibers in the pyramid of the cat.

The present study was undertaken with the primary aim of obtaining information concerning what kind of impulses are mediated via the ascending fibers of the pyramidal tract. By means of the evoked potential method the existence of the anatomically demonstrated ascending fibers in the pyramidal of the cat has been confirmed.

The electrical activity set up in the pyramidal tract fibers by an afferent volley from various cutaneous and muscular nerves consists of several positive deflections followed by a low-voltage negative wave. The responses to stimulation of cutaneous nerves are considerably larger than those evoked from muscular nerves and show more distinct deflections, suggesting the presence of groups of fibers of different conduction velocities.

There are striking similarities between the ascending and descending pyramidal fiber systems. Thus, the majority of ascending fibers, like the descending ones, appears to be crossed; further, the pyramidal response is greater when induced from nerves supplying the distal parts of the limbs than from nerves innervating the proximal parts; the termination of the ascending fibers in the cerebral cortex finally is much the same as the origin of the descending pyramidal fibers.

It is estimated that 70 to 80 per cent of the ascending exteroceptive impulses in the pyramid travel by direct spinocortical fibers, and the remaining 20 to 30 per cent via nuclei of the dorsal funiculi. The proprioceptive impulses to the pyramid seem to be about equally distributed among the two spinal paths.

The possible functional significance of the ascending pyramidal tract fibers is discussed. The suggestion is ventured that they are in some way of importance for the coordination of differentiated, skilled movements and further that they my represent the still unknown afferent path in the plantar and abdominal reflexes and in the placing and hopping reactions.

Reducing and Post-Reducing Maintenance on the Moderate-Fat Diet

Charlotte M. Young, Ira Ringler, and Betty Jean Greer, J. Am. DIETET. A., 29:890-896, September 1953.

Six college women, 15 to 64 pounds overweight, were studied for ten weeks on a 1400-calorie reducing diet in which 50 per cent of the calories were furnished by fat, followed by a 5½ week post-reducing and weight maintenance period on a diet of essentially the same nitrogen, calcium, and phosphorus content.

Nitrogen, calcium, and phosphorus balance studies were made at the second or third week and at the ninth or tenth week of reduction and again at the fourth week of the post-reducing maintenance period. Basal metabolism also was studied at the same intervals. Fasting blood total lipids, phospholipids, total and free cholesterol values were obtained before and at the end of weight reduction and after four weeks on weight maintenance.

The subjects lost an average of 19.0 pounds in 10 weeks.

The average drop in basal metabolism of 8 per cent observed from the second or third week to the ninth or tenth week of weight loss was maintained after four weeks on a post-reducing maintenance diet.

The nitrogen, calcium, and phosphorus deficits which occurred in the majority of subjects by the ninth to tenth week of weight reduction were reversed on most cases by the fourth post-reducing week. All subjects were either in retention or balance for nitrogen, and only one subject in six remained in calcium or phosphorus deficit.

In the 5½ week post-reducing maintenance period, the total daily caloric requirement was found to range from 1815 to 2130 calories with a mean requirement of 1947 calories.

As a general trend, the total lipid, phospholipid, and total cholesterol values for fasting blood of practically all subjects increased somewhat with weight reduction. In the majority of cases these values increased to a limited degree in the post-reducing maintenance period.

Axillary Odor, Experimental Study of the Role of Bacteria, Apocrine Sweat, and Deodorants

Walter B. Shelley, Harry J. Hurley, Jr., and Anna C. Nichols, ARCH. DERMAT. & SYPH., 58:430-446, October 1953.

Apocrine sweat is odorless and sterile when it initially appears on the skin surface. Axillary microorganisms acting on the apocrine sweat in vitro will promote the development of the typical acrid axillary body odor within a few hours. Exclusive of these organisms (sterile apocrine sweat) or inhibition of their growth (addition of hexachlorophene to the sweat) will prevent any odor from developing.

The only substrate required for the production of this distinctive malodorous scent is apocrine sweat. From a practical standpoint, the intensive use of hexachlorophene-detergent preparations will abolish the axillary odor for more than 18 hours in most persons.

The presence of hair greatly increases axillary odor, since it acts as a collecting site for axillary secretions, debris, keratin, and bacteria. Shaving and careful washing of the axilla eliminate odor for more than 24 hours.

Pure eccrine sweat, whether sterile or unsterile, neither has nor develops an odor. Eccrine sweat, contaminated with sebum, keratin, or debris, develops odor presumably as a result of bacterial action. This odor is mild and very definitely distinct from the odor developing in pure apocrine sweat. The role of the eccrine sweat in the production of axillary odor consists of an accentuation of bacterial growth and also the volatilization of the odoriferous compounds derived from apocrine sweat.

No significant reduction in eccrine or apocrine sweating was seen following the use of preparations containing aluminum salts. Aluminum preparations have demonstrable deodorant activity. Daily applications of these substances will abolish or alter

the usual axillary odor in many persons for 12 to 18 hours. This deodorant activity in the case of aluminum chloride is based on antibacterial action and a chemical effect on the odoriferous products.

Neuro-Ophthalmology

Frank Payne, ARCH. OPHTH., 50:644-666, November 1953.

The author presents an intensive annual review of the recent advances made on the eye. He includes the anatomy, physiology, disease and disabilities of the visual pathways; a discussion of the pupils, extraocular muscles and the diseases related to each; visual manifestations of disease, higher visual functions and syndromes. The bibliography is extensive and recent.

Effects of Lesions on Subcortically Evoked Movement in Cat

Charles D. Hendley and Robert Hodes, J. NEUROPHYSIOL., XVI: 587-594, November 1953.

The results of an investigation of the descending pathways involved in the elaboration of subcortically evoked movement is reported in this paper. Lesions were placed in the pons, midbrain, and posterior diencephalon by an electrolytic procedure to eliminate subcortically enduced movement but sparing the corticospinal pathway. The reverse was tried also, to see if subcortically evoked movement would be spared when the pyramidal tracts were destroyed by discrete lesions in the pons.

Twenty cats, lightly anesthetized with pentobarbital sodium were included in this series. The animals were placed in a Horsley-Clarke stereotaxic apparatus and their rostral brain stems explored for foreleg movement produced by low-frequency electrical stimulation.

The movement most easily elicited by cortical or subcortical stimulation was flexion of the contralateral foreleg. Cortical stimulation caused flexion mainly at the shoulder while deep stimulation produced flexion chiefly at the elbow. With subcortical stimulation, flexion at the elbow was almost always the first movement seen with threshold stimulation. An increase of stimulus intensity, however, produced a component of shoulder flexion and a very strong stimuli might demonstrate this to be the most prominent feature of the movement.

Hypothalmic stimulation resulted in movements of pronation or supination of the forepaw, handleg flexion, rotation of the pelvis, and facial and jaw motion.

It was found that it was always necessary to make electrolytic lesions down to the base of the brain to abolish subcortical movement completely. Destroying the medial portions of the cerebral peduncle was necessary to eliminate cortical and subcortical evoked movement. When only the lateral portions of the peduncles were burned movements obtained by stimulation of both the subcortex and motor cortex were preserved. These results suggest a pathway for movement, distinctive from the corticospinal tracts, that originates in or passes through the caudate nucleus. It then proceeds caudad in or close to the internal capsule, assuming a medial position thru the diencephalon before swinging laterally in the midbrain to enter the ipsilateral basis peduncle and continue caudad in the pyramids.

Relation of Ocular Dominance, Handedness, and the Controlling Eye in Binocular Vision

George E. Berner, and Dorothy E. Berner, ARCH. OPHTH., 50:603-608, November 1953.

During the course of studies of binocular vision, the authors met evidence which led them to form the following hypothesis:

(a) When the controlling eye in binocular vision is on the side of the handedness, no chain of symptoms referable to eye-hand confusion is likely to occur.

(b) When the controlling eye in binocular vision is on the side opposite the handedness, some part or all of the chain of symptoms is likely to occur.

(c) When two hands are used, the stronger the relative control of one eye (if the controlling eye is on the side opposite the more commonly used hand) the more likely symptoms are to occur. Reversely, if the use of a second hand disrupts a well-established eye-hand pattern on the opposite side, symptoms are likely to occur.

Investigation of more than 500 patients with and without symptoms of reading difficulty, defects of speech, and allied visual-motor disorganization convinced us that this hypothesis operates beyond the operation of chance.

Treatment based on these concepts is a distinct adjunct to the successful handling of many cases which reach the ophthalmologist in consultation.

Hypoglycemia and the Use of Tobacco

P. T. Bohan, and M. G. Berry, G. P., VII:63-64, November 1953.

Over a period of about 7 years, 38 patients were studied because of symptoms of hypoglycemia. They were troubled by attacks of dizziness, feelings of uncertainty and apprehensiveness, and episodes of "blind staggers."

Glucose tolerance tests showed blood dextrose levels at 50 mg. or less at four to six hours. Almost all of these patients smoked tobacco excessively. When these smokers abstained from smoking, symptoms of hypoglycemia disappeared, and glucose tolerance tests became normal. Not only did these patients feel better, but some of them undoubtedly were spared a laparotomy for the purpose of searching for an adenoma of the islands of Langerhans.

The Prevalence of Foot Defects Among Wartime Recruits

D. Hewitt, A. M. Stewart, and J. W. Webb, BRIT. M. J., No. 4839: 745-749, Oct. 3, 1953.

There is a general, if unconfirmed, impression that foot defects are common, painful, and incapacitating enough to justify more attention than they have hitherto received from epidemiologists.

In a sample of 22,843 men aged 17 to 44 who were examined at Leicester in 1941, it was found that:

1. There was an increase with age in the incidence of rigid flat-foot, hammer-toe, hallux valgus, callosities, overlapping toes, and pes cavus. Hallux rigidus and mobile flat-foot showed a relatively even age incidence.

2. There was a real tendency for foot defects to occur in association with one another and with certain other skeletal defects.

3. Tall men suffered more often than short men from metatarsal de-

fects (hallux rigidus excepted), but flat-foot more commonly affected short than tall men.

4. The risk of metatarsal defects increased continuously with increasing "linearity" of body build (as measured by the index $Ht \div 3\sqrt{W}$). Flat-foot, on the other hand, was more common among men of stocky build.

5. Men in the lower social classes suffered more often than others from foot defects. The erroneous impression (which predates the National Health Service) that all social classes are equally affected may have been due to a tendency on the part of well-to-do persons to seek medical advice for minor aliments more often than members of the working classes.

Incidence, Origin, and Prevention of Certain Foot Defects

Doris A. Craigmile, BRIT. M. J. No. 4839:749-752, October 3, 1953.

This paper reports on three surveys which were made in an attempt to assess the most important foot defects in adults, their mode and time of origin in the child, and a suggested scheme to minimize their development. The surveys were made on factory workers, school children and Ealing contributory shoe scheme (a scheme open to all children attending one welfare centre and one school in the area).

A survey to study the main causes of foot trouble in the adult suggests that bunions and hallux valgus, metatarsalgio, long-arch pain, and corns are the chief types of foot disability in healthy adults. An examination of school children has shown that these defects begin in the later years of childhood. An attempt to maintain foot health by providing children with good footwear and by supervising their feet during the growing period showed that it is possible to prevent deformities and that certain early defects will correct spontaneously, given freedom for normal growth.

Trauma and Cardiac Complications

Romeo J. Lajoie, INDUST. MED. & SURG., 22:514-519, November 1953.

Heart complications do arise out of, or are caused or precipitated by, nonpenetrating injury to the chest.

Contusion of the heart is a common complication of steering wheel accidents. It is caused by compression of the chest.

Electrocardiographic studies should be made whenever there is a history of injury to the chest; also in automobile accidents when there are serious body injuries.

Acute coronary occlusion with myocardial infarction does arise in the course of employment. The final determination of the case is often based on the opinion of the consultant cardiologist.

Whenever there is no incident of stress, strain, or overexertion, a claim is likely to be denied. Whenever the incident of stress, strain or overexertion precedes the clinical manifestation of the symptoms by several hours or days, the claim is also likely to be denied.

When the applicant experiences an incident of unusual stress or strain, and is aware of clinical manifestation of symptoms during, or immediately after, such incident, there is definite causal relationship between his occupation and his disability.

It is the general belief that there must be pre-existing disease or damage to the coronary artery before an occulusion or a thrombosis can develop in that artery. The potential, as well as the real liability should be appraised early in any given case.

Locally Administered Hydrocortisone in the Rheumatic Diseases

Ernest M. Brown, Jr., J. Bruce Frain, Louis Udell, and Joseph L. Hollander, AM. J. MED., 15:655, 656-665, November, 1953.

Most forms of arthritis and rheumatic diseases are systemic in nature, and not local. However, the inflammation may be manifest in only one or a few joints. The effects of administering cortisone and hydrocortisone directly into the diseased tissues have been studied and results have shown a local response equal to or greater than those produced by parenteral or oral administration.

Cortisone acetate was first tried and injected into the diseased knees of 7 rheumatoid arthritis patients. This did not produce consistent favorable results.

A study was then begun using hydrocortisone on 547 patients, with a total of 3,757 injections, and given over a period of 18 months.

The patients chosen were those who had arthritis or other local rheumatic inflammation; any diarthrodial joints except those of the spine; or of any accessible bursa, tendon sheath or serious cavity. The technic for the intra-articular injection of hydrocortisone was that of aspirating the joint and introducing the suspension, following simple sterility observed in any clinic procedure.

The area where the synovial cavity was most superficial and free of overlying large vessels and trunks was the chosen site of injection. Dosage ranged from 5 to 25 mg., depending upon the joint. No more than 50 mg. were used in any joint in one installation. Injections were repeated at intervals of from 3 days to several months. The average rheumatoid joint required injection every 10 days, while the osteoarthritic joint only required reinjection every 14 to 21 days. This form of local therapy was used in most cases along with physical therapy, orthopedic measures, and systemic drug therapy. Individual patient records were maintained, and carried in detail all aspects of each patient's condition, progress, dosage, etc.

The results were given according to injections and cases. An "injection success" meant the patient had improvement in signs and symptoms for at least 3 days following the injection. An "injection failure" resulted when these criteria were not fulfilled. A "case success" occurred when a series of injections into one or more arthritic joint of a single patient gave relief for at least a week. Patients not obtaining consistent relief from repeated injections were listed as "case failures."

The results were as follows:

Case Success — Permanent — 20 per cent (1 or more injections were successful and no further treatment was required).

Case Success — Maintenance — 54 per cent (repeated interval injections were of continued benefit).

Case Failure — 14 per cent (insufficient benefit or total failure after repeated trials).

Doubtful — 12 per cent (follow-up inadequate).

The majority of injection failures were found to have occurred after injections when there had been doubt as to whether or not the joint space had actually been entered. The hydrocortisone suspension must be injected directly into the synovial cavity in order to be effective.

Knees were the joints most commonly injected, and these included 1,758 injections into rheumatoid arthritic knees; 1,034 into osteoarthritic knees; and 55 into knees inflamed from other causes.

An effort was made to determine whether concurrent systemic therapy

influenced patient response to local hydrocortisone therapy, but concrete results were not obtained.

There were 88 adverse reactions to these injections, which is 2.3 per cent of the total injections. These reactions were mostly evidenced by temporary local exacerbations of the joint inflammation, which, though painful did not cause the patients to miss an injection. In most of these cases, improvement over the pre-injection state was noted in 24 to 48 hours following injection.

The conclusions drawn from this study regarding the use of local hydrocortisone therapy are as follows:

1. Suppression of acute or chronic inflammation, excluding infectious inflammation, of one or more peripheral joints.
2. Suppression of acute or chronic nonspecific inflammation of bursae and tendon sheaths.
3. Therapeutic control of pain of one or more joints in the presence of widespread joint disease.
4. Suppression of local disease in actively involved joints while systemic therapy is being effected, or where systemic therapy is contraindicated.
5. Therapeutic control of more resistant joints allowing more effective systemic therapy or lower dosage of systemic therapy.
6. Suppression of inflammation in joints showing early progressive deformity, thus enhancing the effect of concommitant therapy.
7. Suppression of joint inflammation before or after surgical or orthopedic measures.

In the presence of joint infection or hypersensitivety to the drug or the constituents of the suspension, local injection of hydrocortisone would be contraindicated.

The instances in which local hydrocortisone therapy may not be beneficial, or may be dangerous, are listed as follows:

1. Diseased spinal joints do not respond to this therapy, either because of anatomic inaccessibility or multiplicity of joints involved.
2. Joints without synovial space usually can not be treated successfully in this manner.
3. Several trials resulting in failure indicate further treatment is probably useless.
4. Where there is generalized active involvement of many joints, this type of therapy may not be of benefit.
5. Repeated hydrocortisone injections may inhibit normal healing in the case of severe trauma with fracture or derangement of the bones or joint tissues.
6. Local therapy must always be given in conjunction with other therapeutic measures, and with an understanding of the disease process involved.

The Use of Pulmonary Function Tests for Disability Appraisal: Including Evaluation Standards in Chronic Pulmonary Disease

Hurley L. Motley, DIS. OF CHEST, XXIV:378-389, October 1953.

An accurate evaluation of the degree of pulmonary function impairment can be made from the following physiological tests: (1) ventilation measurements from spirogram tracings (total vital capacity, three second vital capacity, maximal breathing capacity and the shape of the exhalation curve following a deep breath), (2) the degree of bronchospasm present, (3) the residual volume and alveolar nitrogen per cent after 7 minutes oxygen breathing, (4) the arterial blood oxygen saturation at rest and immediately after step-up exercise, (5) the oxygen uptake during step-up exercise and (6) the character and duration of dyspnea after step-up exercise.

A numerical ventilation factor has been derived from the three second vital capacity (a timed measurement), the maximal breathing capacity and the residual per cent of total lung volume. In about 75 per cent of the group of 500 coal miners studied the ventilation factor was correct in predicting the degree of pulmonary function impairment as compared to an evaluation based on comprehensive studies including arterial blood and respiratory gas analysis.

Improved technics and apparatus for measuring maximal breathing capacity and residual air volumes by the oxygen open circuit method are presented.

The step-up exercise test is quite satisfactory for obtaining the exercise measurements in pulmonary function evaluation, equal to or superior to the treadmill.

Vital capacity as a volume measurement should not be used as a single test of lung function in chronic pulmonary disease, as it can be misleading and responsible for false interpretations.

Evaluation standards for the normal and four grades of pulmonary function impairment are given for the physiological tests which appear to be most useful in pulmonary function appraisal.

The Reciprocal Nature of Growth and Behavior in the Fetus and Infant

Emma H. Collins, GROWTH, 17:163-167, September 1953.

The intent of this paper is to illustrate a hypothesis of reciprocal relationship between somatic (cellular) growth and integrative (functional) growth in the human body. The illustration is most striking during the rapid growth phases of which the author shall draw upon the consecutive periods of prenatal development and infancy for the accompanying graph.

This paper illustrates the reciprocal relationship in humans (if not in other living creatures having rapid growth spurts) between somatic (cellular) growth represented by kg/yr. and integrative growth (activity), by compiling the available anthropometric measurements of A. C. Wetzel and G. L. Streeter, with the behavior data of D. Hooker and A. Gessell. The relationship is most strikingly evident by observation of the rapid growth periods and the author has chosen the time of the fetus and the infant for purposes of charting. To the author's knowledge, this relationship has not previously been demonstrated.

A theory of distribution and competition for available body energies has been proposed as a likely setting for the succession of body growth which explains the necessity for an inverse proportion between somatic and integrative growth.

A more complete definition of the period of infancy is suggested from analysis of the materials.

Advantages and Complications of Tracheotomy

H. S. Davis, H. E. Kretchmer, and R. Bryce-Smith, J.A.M.A., 153:-1156-1159, Nov. 28, 1953.

A total of 155 patients with tracheotomies were studied in order to determine the incidence and severity of complications related to

the procedure. The patients studied represent a cross-section of conditions in which tracheotomy is often performed and the operations were of both the elective and emergency types.

Eighty-four per cent of 56 cases followed showed good cosmetic results and it has been shown that primary healing can be expected regardless of how long the tracheotomy tube is left in place. Complications arose in 54 of the total 155 cases. Of these, 20 could be considered as major complications, 14 of the operations being emergencies.

Elective tracheotomy with a clear airway provided, reduces the number of serious complications and should be considered a procedure of choice over the emergency operation. It must be taken into consideration that the seriousness and gravity of the patient's illness will have a direct bearing on the incidence of complications. Care must be exercised in performing the tracheotomy so that the problems of nursing care are minimized.

Tracheotomies are recommended whenever the patient's ability to maintain an airway or remove secretions is seriously impaired.

Observations on Peripheral Circulation in Psoriasis

Stanley E. Huff, and Henry Longstreet Taylor, ARCH. DERMAT. & SYPH., 58:385-388, October 1953.

Previous work has demonstrated that patients with lupus erythematosus have an altered peripheral circulation, as demonstrated by changes in the form of the photoelectric plethysmogram of the fingers. It is the purpose of this paper to present evidence that the same kind of changes exist in the peripheral circulation of patients with psoriasis. This alteration in the peripheral circulation is similar to that reported in arteriosclerosis, hypertension, pseudoxanthoma elasticum, and scleroderma.

Photoelectric plethysmograms of the fingers of 28 normal controls and of 11 patients with psoriasis have been studied.

The plethysmograms of patients with psoriasis as a group are abnormal. The crest times are prolonged, and the dicrotic notches are obliterated.

This study furnishes additional evidence of a vascular dysfunction in patients with psoriasis.

The Treatment of Gout

John H. Talbott, and L. Maxwell Lockie, GERIATRICS, 8:599-610, November, 1953.

Several factors may aid in the diagnosis of gout. It is often sudden in onset, occurs more frequently in males, and usually there is a familial history of the disease. Gout may be precipitated by direct trauma, nonarticular infection, dietary indiscretion, emotional disturbance, or the parenteral use of a number of drugs. The metatarsophalangeal joint of the great toe is the most affected joint, although other joints may be affected. The concentration of serum uric acid may also be used in establishing diagnosis. However, characteristic roentgenographic changes or findings of subcutaneous tophi may not be evident in early attacks of gout.

When diagnosis is established, a therapeutic program should be initiated, and the patient should assume his share of the responsibility for cooperating with this program.

Colchicine by mouth is the recommended drug, and it is to be administered at the first sign of an attack. To be fully effective, oral Colchicine is to be taken in full course, usually ten tablets per person, one dose taken every hour until subsidence of pain. Should gastrointestinal symptoms develop from this drug, tincture of camphorated opium may be administered and repeated every two hours until these symptoms disappear. If the full course of Colchicine does not give the desired relief, Butazoliden or ACTH may be given in the interim of the 24 to 36 hours before readministration of Colchicine.

The prophylactic use of Colchicine is recommended, should a known precipitating agent be present. It should also be taken by patients periodically during the intercritical period.

Sodium salicylate is recommended in the treatment of chronic gout, since it is analgesic as well as uricosuric.

Benemid is a new drug which holds possibilities due to its uricosuric action. Its dosage is determined by the gastrointestinal tolerance of the patient. Benemid may be administered daily along with Colchicine to those patients who are moderately or severely affected. There are certain side effects resulting from the use of Benemid, which must be considered when administering the drug.

General treatment of gout includes rest to the affected joints, abundance of fluids, and a light diet. The use of one of the various forms of heat, applied to the affected joint, is of doubtful value.

If there is synovial effusion of appreciable amount, the fluid should be aspirated, and an elastic bandage applied and worn for the following two days.

Rehabilitation of the patient should be begun as soon as the pain subsides.

Proper diet is very important for the patient with gout. It should be balanced with regard to fats, proteins, and carbohydrates, and should be low in purines. There should be a high fluid intake. Alcoholic beverages usually may be tolerated in moderation.

For patients with chronic tophaceous gout, surgery may be required for the feet, hands or elbow. Complete removal of the uretes by curettage is the desired result. The hazards of surgery are negligible.

The prognosis for most patients with gout is favorable.

Central Inhibition in Cortical Conditioned Reflexes

Frank Morrell and Merrill H. Ross, ARCH. NEUROL. & PSYCHIAT., 70: 611-616, November 1953.

In the normal electroencephalogram the alpha potential is a fairly regular 8- to 13-cps rhythm, which is best obtained from the occipital leads and is most prominent in the waking, but resting, state. It is normally promptly suppressed by visual attention, such as is produced by flashing a light in the subject's eyes. It also can be blocked by any sufficiently forceful stimulus requiring alertness and attentiveness, such as a loud sound or the solving of a difficult mathematical problem. However, except for these forceful stimuli, the blocking of the alpha potential is fairly specific for visual effects and does not normally respond, for example, to sounds of low intensity. Therefore, at least within a certain range of intensity, the alpha blocking to visual stimuli is a specific inborn, or unconditioned response.

By successive pairing of a sound stimulus of low intensity with the light stimulus the alpha rhythm can be conditioned to respond to a sound stimulus alone. The establishment and differentiation of conditioned reflexes imply the existence of specific excitatory and inhibitory processes, the magnitude and characteristics of which have never been

directly observed. The authors employ two measurements; (1) the graphic demonstration in electroencephalographic tracings of the origin, course, and spread of the induced electrical activity, and (2) the determinations of the rate of cortical conduction between the occipital and the precentral region.

Three distinct forms of Pavlovian inhibition were established; extinction of conditioned reflex, delayed conditioning, and differential inhibition. The above measurements were made under each of these categories, and the results indicate a significant delay in cortical conduction time whenever the inhibitory process is induced, as demonstrated by the electroencephalogram.

The delay in conduction time indicates the presence, and measures the degree, of the central inhibitory process.

Abstractors for March

Those who assisted with the abstracts for March are:

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Book Reviews . . . . .

Child Development: The Process of Growing Up in Society. *By William E. Martin and Celia Burns Stendler, Professors of Education at the University of Illinois; under the editorship of Willard B. Spalding, Professor of Education, Oregon State System of Higher Education, Portland, Oregon. Cloth binding. Price, $6.50; Pp. 519, with 35 pages of photographs and drawings. Harcourt, Brace and Co., New York, 1953.*

This book is a welcome and useful addition to the understanding of the socialization process of the child. It is divided into four parts: The Child; Society and Culture; Socialization; Socializing Agents. As far as the text of the book can be stated in simple terms, the central theme is something like this: the child is a highly integrated bio-social organism, depending on multiple stimuli for motivation and social goals.

The authors throughout follow a pattern of bio-cultural comparisons. The human child is fitted into the matrix of his organic evolutionary sequence. The child, growing up in our American culture, is fitted into the framework of other ethnic cultures, both primitive and more advanced. Man, say the authors, is set apart by special care of the young, a high level of activity, stability and flexibility of skeleton during growth, and efficient use of food. This gives him a unique potential, so that he is intelligent, adaptive, individualized, and finally socialized. The entire book develops these concepts.

In essence the goal of socialization seems to be to channelize innate drives and impulses into socially acceptable paths. The child, as he grows, becomes culturized, so to speak; he becomes a conformist. However, the authors side-step the potential rigidity inherent in such a set-up by emphasizing the relation between maturation — the child's own rate of progress toward maturity — and the performance of social tasks. Hence, variability is the usual, rather than slavish adherence to the average. Other factors of variability are found in heredity, in sex differences, and in bio-physical differences (health, diet, endocrines, etc.).

As one reads this book one discerns the influence of Gesell, Mead, the "Developmental Task" concept of the University of Chicago, and other authors and/or themes. The whole is well synthesized to give a good running account of Child and Society — and Child *in* Society.

Disability Evaluation. By *Earl D. McBryde, M.D., F.A.C.S.; Assistant Professor in Orthopedic Surgery, University of Oklahoma School of Medicine; Attending Orthopedic Surgeon to St. Anthony's Hospital; Associate Orthopedic Surgeon to Wesley Hospital; Visiting Surgeon to W. J. Bryan School for Crippled Children; Chief of Staff to Bone and Joint Hospital, Oklahoma City, Oklahoma. Fifth Edition. Cloth. Price: $15.00. Pp. 715, with 375 figure numbers. J. B. Lippincott Company, Philadelphia, 1953.*

This book offers invaluable information for orthopedists, physicians, and lawyers in industry who deal with evaluation of disability resulting from industrial injury. It contains a mass of well organized material which is clearly presented and illustrated by numerous detailed charts, pictures, and diagrams.

The purpose of the book is to outline the essentials necessary for evaluating disability. This edition contains many improvements. The causal relation of injury to disease has been included, treating the subject of cases where claims have been made that injury was the cause of a disabling disease. The rating schedule of partial disability also has been improved and enlarged. This is the author's effort to clarify the present confusion of existing rating schedules which will serve as a guide to uniformity and standardization.

Material presented is practical. Analysis of factors which compose function is outlined and percentage values are given to each. Procedure in evaluating disability gives the physician an outline for arriving at the percentage of permanent disability. Charts for functional testing and evaluation of permanent disability in each part of the body rate each factor involved so that total lessened function may be determined. Details for examination of various disabilities are discussed.

Large sections of the book are given to the subjects of ankylosis and fractures. Ankylosis of each joint is considered under the headings of complete ankylosis, partial ankylosis, evaluating permanent disability, and readjustment possibilities. Fractures are similarly discussed. Additional subjects considered are back injuries, trunk injuries, nerve injuries, amputations, head injuries, injuries of the eye and ear, burns, hernia, and employment of the disabled person.

Although this book is intended chiefly for the physician, the physical

therapist will find it to be a valuable reference book. Concise information on orthopedic conditions is made available. Goniometry measurements for various joints are illustrated. The general subject of fractures — their repair, associated affections, and deformity — is particularly well treated. It offers the physical therapist a good source of material on factors relating to disability.

A Syllabus of Cerebral Palsy Treatment Techniques. By *Marguerite Abbott, B.S., O.T.R., Executive Director of the Coordinating Council for Cerebral Palsy, Inc., New York, N. Y. and Instructor in Occupational Therapy, Columbia University. Price $1.50; Pp. 136. National Association for Crippled Children, New York, 1953.*

This syllabus is one of a series of publications to be presented through a plan of the Education Committee of the American Occupational Therapy Association. This plan is to make instructional material for the student more readily available through publication. This manual was prepared by Marguerite Abbott of the Columbia University School of Occupational Therapy. It contains the various present-day concepts and treatment procedures used by outstanding authorities in the field of cerebral palsy.

The foreword (Unit I) introduces the term cerebral palsy by definition, a brief history and the field at the present time. It states that the "objective of this manual is to point up, in an unbiased compilation, an orientation to several of the more familiar techniques of treatment as employed by the physical and occupational therapists."

In Units II and III the basic diagnostic types are classified and the clinical signs of each are listed. Unit IV briefly presents some of the treatment technics for cerebral palsy, namely: the progressive patterns of movement based on simple reflexes (Fay); correct voluntary performance of simple motions by resistance (Kabat); fifteen modalities based on a specific diagnostic classification (Phelps); the functional approach (Deaver).

In Unit V some of these technics are greatly enlarged upon in treatment by occupational therapy and in Unit VI some basic principles of treatment by physical therapy are developed — mainly those of Kabat and Phelps. In Unit VII the author has compiled a list of the various types of records to be kept in every cerebral palsy treatment center. Several of these are illustrated. The manual also includes an excellent list of selected readings on medical information, handedness, occupational therapy and physical therapy in cerebral palsy, in addition to the several specific references throughout the book.

This syllabus fulfills its purpose very well, not only as a guide for planning treatment in cerebral palsy but also as a basis for instruction to the student of both occupational therapy and physical therapy. This is so particularly, because of the syllabus form, the unbiased inclusion of several methods of neuromuscular treatment technics, and the excellent references and lists of selected readings.

The Troubled Mind. *By Beulah Chamberlain Bosselman, M.D., Clinical Associate Professor of Psychiatry, University of Illinois Medical School. Cloth; price $3.50. Pp. 192. The Ronald Press, New York, 1953.*

In this book the author strives to widen the horizons of psychiatric knowledge by using a more informal approach to personality evaluation than is customarily found, and encourages the layman to understand himself better. As an associate professor of psychiatry she is well qualified to do this. The book is written in a simple, direct, and clear style, which should appeal especially to the nonprofessional.

Developmental processes from infancy through old age are outlined and illustrations given of satisfactory and unsatisfactory ways of solving inevitable problems at a variety of age levels, with adjustment and adaptability at the adult level being the ultimate goal of socialization.

Examples of mildly deviant, neurotic, and psychotic manifestations are presented and a comprehensive survey given of the basic dynamic processes involved in adjustment. These include such factors as child-parent relationships; sibling relations; special adaptive mechanisms of childhood; transitions from adolescence to maturity; the requirements of maturity and its frustrations; and the special problems of old age. Syndromes also include classical and atypical neurotic and psychotic case histories.

Technics of treatment are discussed and a comprehensive bibliography is appended. Because of its simplicity of style and logical presentation of ideas, this book should constitute a real contribution to those wishing information on this subject without extensive background and training.

The Epidemiology of Health. *Edited by Iago Galdston, M.D. With foreword by Howard A. Craig, M.D., Director, New York Academy of Medicine. Cloth; price $4.00. Pp. 197. Health Education Council, New York, New York, 1953.*

The Eleventh Annual Eastern States Health Education Conference, sponsored by the New York Academy of Medicine, was concerned with the concept of an epidemiology of health. This volume deals with various aspects of this concept as presented by many distinguished discussants at this conference.

The development of and the need for this concept is briefly described, after which the changing concepts of health and disease as they have been influenced by changing religious, cultural and social ideas are surveyed. This is followed by a brief but excellent review of the history of epidemiological thinking as it has finally led to the modern concept of epidemiology as medical ecology. The preventive medicine program in the army, and industrial medical programs are then described. As examples of the study of the epidemiology of health, the problems of tuberculosis, mental health, nutrition and old age are reviewed. The book is concluded by a discussion of certain aspects of medical and health education which appear to be only tangentially related to the main theme.

The development of the concept of an epidemiology of health has parallelled a changing emphasis in preventive medicine. Rather than viewing health as the absence of disease, it is concerned with studying those factors that contribute toward the achievement of an optimum state of health. Even though this concept may be philosophically useful, one is struck by the generalities of the discussions in this book. This, obviously, reflects the lack of basic knowledge in this area. Perhaps further discussion of these ideas would be instrumental in influencing research along these lines.

The reviews here published have been prepared by competent authorities and do not represent the opinions of the American Physical Therapy Association.

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